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PERCIVAL SHELDON RIDSDALE, Editor

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A VIEW OF THE TOWN OF QUILLAN, EASTERN PYRENEES, WHICH MAJOR STUART DECLARES IS THE HOME OF THE BEST FRENCH COOKS AND OF A HIGH GRADE OF PATE DES FOIE GRAS (PAGE 1193)



THE ENTRANCE OF THE RIVER AUDE, NEAR QUILLAN, EASTERN PYRENEES, INTO THE GORGE WHICH IT HAS CARVED FOR ITSELF EN ROUTE TO THE SEA (PAGE 1193)

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FORESTERS AND LUMBERMEN HOME FROM FRANCE

BY MAJOR DAVID T. MASON, 20th ENGINEERS (FORESTRY)

AND

PERCIVAL SHELDON RIDSDALE, EDITOR OF AMERICAN FORESTRY MAGAZINE

PRACTICALLY all of the foresters and lumbermen sent to France as members of the Twentieth Engineers (Forestry) have returned home and been discharged from the service. They came back with the knowledge that they accomplished the job which was given them, that of supplying the United States Army with all the lumber and fuel wood it required, in a manner which won the admiration of all who know of the unceasing demands made upon them and of the difficulties which they had to overcome. They worked with the spirit which wins success and they return with an experience and a training which will greatly increase their ability and render them much more capable than they ever were before of doing whatever work is assigned to them.

The men who before the war were employed by the Forest Service will return to the Service in the same

or better positions, those who gave up jobs with lumber companies learn that their jobs or better ones are waiting for them, and men of other vocations who joined the forestry and lumber regiment will have no difficulty in obtaining work, for their two years' training in France has made them better men in every way.

The first of these forest and lumber troops arrived in France in October, 1917. The units comprised approximately twelve hundred men. By the end of the month the several detachments into which the regiment was divided were at work in forests in eastern, southwestern, northwestern and central France. During the long wait for the sawmill equipment there was much preliminary work to be done, such as establishing camps, building roads, cutting and decking logs. A number of small French mills were leased or bought to start lumber production. The other units began to arrive at their stations



MARITIME PINE LOGS BEING UNLOADED FROM NARROW GAUGE CARS INTO MILL POND IN PINE FORESTS IN SOUTHWESTERN FRANCE. AMERICAN 20-M MILL IN BACKGROUND

in France in December, 1918, and there was a steady flow of forest and lumber troops from America to France until by midsummer, 1918, there were about eighteen thousand Americans at work in the French forests. From the small amount of timber produced at first the output increased rapidly until for the month of September, 1918, it consisted of forty-two million feet of sawn material, including four hundred forty thousand railway ties, of thirty-six hundred pieces of piling mostly over fifty feet long, of five hundred sixty thousand poles and of thirty-eight thousand cords of fuel. By this time there were eighty-one American sawmills at work. But

able record in lumber production. At Pontenx, a lumber camp near Bordeaux, a set of curves showed graphically just what each shift at each mill accomplished each day; each shift and each mill was trying for the high record, and the palm often changed hands. High monthly records were more prized than high daily records. To keep up the interest between districts in which the lumberjacks were working, the central office of the regiment at Tours sent out each month the records for each of the eighty-one American mills finally operating in France.

The best single day record is that of the twenty-M



INTERIOR OF AN AMERICAN SAW MILL IN FRANCE, SHOWING ONE OF THE LOG CARRIERS WHICH THE FRENCH CHILDREN NEVER TIRED OF WATCHING

still the prospective timber demands of the ever increasing American Army were not fully assured, and when the armistice brought fighting to an end in November work was well under way in the United States to more than double the number of forestry troops in France, and units amounting to twenty-four thousand men were being organized.

Americans never work so happily and effectively as when they make a game of the job and compete with some one else or some other group doing the same sort of work. This characteristic helped win the war by driving more rivets and building ships faster than such work had been done before; it helped in France building warehouses, unloading vessels and in reducing salients; it was a valuable asset in the forest operations of the Twentieth Engineers (Forestry), which made a remark-

mill at Levier in the Vosges. This mill, which had been overhauled and improved somewhat, cut 163,000 feet in twenty-four hours. The many other good records made by American mills in other parts of France, as well as the many different types of forest encountered and the different methods of operation will make the history of the Twentieth Engineers an exceedingly interesting one.

Before the work of the lumber regiment was well under way in the Landes a few small political clouds appeared momentarily in the sky. Timber was being acquired rapidly, but under the policy that not more than one year's cut would be bought ahead of any single mill; the delay in the arrival of equipment made it look for a time as though the regiment would fall far behind the program; some of the French were skeptical of the abil-



A LARGE LOAD OF MARITIME PINE LOGS ON AN AMERICAN MOTOR TRUCK IN SOUTHWESTERN FRANCE

ity of the mills to cut even as much as the rated capacity. Peasants dependent upon the resin industry were frightened for fear that the Americans would destroy their means of livelihood by cutting too much timber. Timber merchants who hoped to sell timber to the Americans at fabulous prices were having their toes pinched by that effective steam roller—the requisition—which took the timber required at a reasonable price fixed by the French forest officers. Complaints were heard in the French Chamber of Deputies (corresponding to the Congress of

the United States). The officers of the regiment were reminded of the early days of the Forest Service in America, when certain senators and congressmen were accustomed to make the most wild and ridiculous statements in the halls of Congress about the work of the Forest Service. Among the alleged acts of the Americans were the devastating of enormous areas of timber land by unrestricted cutting, the clearing of camp sites by the use of fire which escaped and ran for miles, and other equally indefensible acts. One of the chief mourn-



20th REGIMENT MEN TRANSPORTING LOGS, BY MEANS OF "BIG WHEELS," TO THE BANK OF THE COURANT RIVER, AUREILHAN OPERATION, NEAR PONTENX, LANDES, FRANCE

ers was a timber merchant from Landes. The Minister of Agriculture agreed to send his Inspector General of Forests to look into the troubles.

The Inspector General and a party of French forest officers arrived at Pontenx to visit the American operations. They went over the ground carefully, but found no evidences of ruthless devastation. They found that fire had been carefully controlled, that the methods of cutting the forest followed absolutely those employed by the French. They were much interested in the work of driving the Courant River, and especially in the scheme

camp; the kitchen was reached just in time to see the cook take a big batch of fine brown cookies from the oven; the hot cookies were greatly enjoyed, for such things were then forbidden in French civil life. A loaf of white bread, practically unknown in France for three years, was given to the Inspector General; this was a most acceptable gift and was very pleasantly received. After this visit no more complaints of American methods were heard.

The French sawmills, several of which were leased or bought for American use during the first few months



CANAL AND CAR BRINGING LOGS UP TO THE HOIST INTO THE AUREILHAN MILL OF THE 20th ENGINEERS NEAR PONTENX, LANDES, FRANCE

of drying out the trees in advance, for apparently the practice of driving loose logs was unknown in the streams of France. The larger mills were cutting at a rate astonishing to the French, for they were even greatly exceeding the regiment's own expectations. The mechanical ingenuity, the power, and the rapidity with which logs were reduced to lumber was admired by the French. They shrugged their shoulders, however, at the thick circular saws, for it gave them real pain to see so much of their precious wood going into sawdust; a few moments, later, fortunately, their faces brightened when they saw the sawdust automatically fed into the "dutch ovens" as fuel, for the French are accustomed to drive their sawmills by power secured from the valuable slabs and edgings while the sawdust is generally a total loss. A little later the party was shown through one of our

after the regiment reached France, were objects of considerable curiosity to Americans. Although a few of these mills are housed in permanent brick buildings in connection with turpentine stills, the typical mill of the region was a very portable affair readily moved about from one small cutting area to another. Usually the main saw, which is frequently the only saw, is a very thin, narrow band saw; sometimes a thin circular saw is used instead. The short logs, ten feet or less in length, are placed by hand on the light saw carriage; a crank turned by hand feeds the log against the saw. The lumber is edged on a very small, light carriage, which runs past the opposite side of the band saw from that on which the log is sawn; the board is held down on the edger carriage by a hook at one end and by the hand of the operator at the other. Generally no trimming is

done. One of the mill hands carries the sawdust away in a basket. The mill is operated by a ten or twelve horse power engine. Ordinarily about four people are employed at such a mill, and they produce from two to three thousand feet of lumber per day. Many of the workers are women. In the woods, the logs are usually cut in lengths less than ten feet long to facilitate handling them at the mill and loading them upon the two-wheel carts which haul them to the mill. The logs are peeled in the woods and are given a chance to dry out to some extent; this lightens the logs for handling and also makes sawing easier.

An American notes at once the close utilization of the timber and the large amount of human rather than mechanical labor used in French operations. The very high

which can be worked hard and forced to yield a large daily production; and these were days when a big output was wanted, even at the cost of some raw material.

The first American mill to operate in the Landes was a ten-M mill which started sawing lumber at the Bellevue camp on the last day of 1917. In addition to the head saw, this mill was equipped with edger and trim saws; there was a blower to remove the sawdust. When this mill caught its stride it cut an average of twenty-seven thousand feet of lumber in the two ten-hour shifts. Its record cut was thirty-nine thousand seven hundred feet in one twenty-hour day. One night an accident to the engine stopped the mill; fortunately there was available a French engine with just about enough power to operate the head saw; this engine was placed at the end of the



MARITIME PINE LOGS DECKED AT A 20-M AMERICAN MILL IN THE SAND DUNE COUNTRY OF SOUTHWESTERN FRANCE

timber values and the low labor costs account for this situation. Just before the war, the French forest laborer, if a man, received from sixty cents to a dollar twenty cents, depending upon his skill, for ten to eleven hours' work per day; he lived at home and furnished his own food. The rate of pay for women was much lower. During the war a muleteer was locally considered a "veritable millionaire;" he demanded three dollars and a half for a day's work for himself, his team of mules and cart, whereas before he had received only half as much.

The sawmills manufactured in the United States and sent to France for the use of the forest troops were in three standard sizes; the bolter mill for small, short logs had a capacity of five thousand feet of lumber in ten hours; the "ten-M" mill had a rated capacity of ten thousand feet in ten hours; and the "twenty-M" mill was designed to cut twenty thousand feet in a ten hour shift. All of these mills used circular saws, which cut a far heavier saw curf than the French mills; it is characteristic of Americans to use strong, heavy machinery

mill, the belt was run across the log deck to the driving pulley of the head saw, and the mill went merrily on for several days, until the regular engine was repaired, cutting and edging eighteen thousand feet of lumber per day on the head saw. When this mill finally ran out of timber, the orders were to move it to a tract of timber at Sabres, a place twenty-five miles away; it was considered that five days was a reasonable time within which to make the move; but by careful planning and organization, this mill was sawing lumber once more at Sabres forty-seven hours after the sawdust stopped flying at Bellevue.

The parts for the twenty-M mills arrived more slowly and it took more time to build them than in the case of the smaller mills. The twenty-M mill at Labroquette, near Pontenx, was the first in its class to operate in France. Two other mills of this size at Bourricos and Aureilhan completed the Pontenx group of mills. April 1, 1918, was the first day upon which all four of the mills of the district operated double shift; on that day

they cut one hundred sixty thousand feet of lumber.

The Aureilhan operation was, on account of the variety of methods involved, perhaps the most interesting of any which Americans conducted in the Landes. The timber tributary to this mill lay partly in the sand dunes near the coast and partly on flat, sandy ground further inland. After the timber was felled and cut into logs, much of it was moved by big wheels, bummers or trucks direct to the Courant River; the more remote dune timber was delivered to a narrow gauge railway, upon which horse-drawn cars transported the logs to the river. The logs were then driven down the river for

Aureilhan Lake is a pretty little sheet of water five or six square miles in area. It was formed only a few generations ago when the sand dunes blocked the river channel. It is said that the ancient village of Aureilhan was buried in the lake. The Aureilhan mill was set near the edge of the lake, and a small canal was dug to bring the logs to the mill during the low water stage. The mill was connected with the French railway system by a spur about a half mile long. Immediately after it was sawed most of the product of the mill was placed in cars for shipment.

The Bourricos mill, to which the logs were delivered



A TIE MILL OF THE 20th ENGINEERS

about four miles, caught in a boom at the point where the river flows into Aureilhan Lake, and towed across the lake to the mill. The maritime pine is so pitchy, sappy and heavy that there was some doubt at first as to whether the logs would float; a few logs tested showed that they would float, but they rode so low in the water that special measures were taken to reduce the weight; several months before the logs were needed at the mill, the trees were felled and left for some time with their branches attached; the leaves continued to function, and so drew much of the water out of the stems of the trees. The stream driving had to be very carefully handled, for with the loose sand bottom and banks there was considerable danger that if jams were formed the water running past would scour out large amounts of sand and form shallows below.

by a narrow gauge logging railway, was set so near the French railway that only a short loading spur was needed. In the case of the Bellevue and Labroquette mills, however, it was necessary to build about four miles of narrow gauge railway to deliver their product at the Pontenx shipping yard, where it was loaded upon the broad gauge cars for final shipment. This narrow gauge line ran along the main street of Pontenx; the villagers no doubt cursed it many times, for it was operated day and night to keep the mill yards clear, and the trainmen took fiendish delight in blowing the whistle of the dinkey locomotive when most people wanted to sleep. At one time for several days, while the locomotive was broken down, motor trucks were used to tow the trains of lumber in from the mills.

During the early stages of the Pontenx operations

there was such difficulty in getting cars in which to ship the product that a considerable amount of storage space seemed necessary; the Pontenx shipping yard was therefore laid out with a capacity of about three million feet of lumber. Although about a million feet did accumulate in the yard soon after the large mills began to operate, a more plentiful supply of main line cars soon reduced the stock. No attempt was made to grade, dry or surface the product; the market was all that an American lumberman could imagine in his rosier dreams; the army wanted more than could be supplied. The shipments from Pontenx consisted principally of sawn railway ties, road plank, lumber, piling, and fuel wood. In the Pontenx yard, a loading crane was constructed which did effective work in lifting fifteen hundred to two thousand feet of lumber or timber from the narrow gauge direct into the main line cars. The French freight car of standard size holds ten tons, or about five thousand feet of the green maritime pine lumber; this is only about one-fifth of the amount of lumber ordinarily loaded in an American freight car.

At one time while railway cars were still scarce, a fleet of more than one hundred motor trucks was assigned to the work of hauling lumber from the mills in the Landes to a point near Bordeaux; a three-ton truck would do the work of a standard freight car, for whereas the motor truck made a one hundred or a one hundred twenty mile round trip in a day the freight car would take several days to deliver its load near Bordeaux and to return to Pontenx.

The branch line railway upon which the Pontenx and Mimizan groups of operations were located served eight

American mills distributed from eight to thirty miles from its junction with the main line railway through the Landes. The American traffic on the branch line, which grew to seventy or eighty cars of lumber and other forest products per day, soon greatly exceeded the French use of the line. Several rather antiquated locomotives were hired from the French, and American train crews handled the American products as far as the main line junction point.

One of the serious problems of the Pontenx operation was the disposal of the great quantities of slabs and edgings which rapidly accumulated at the mills. In France no one would think of sending such material to be burned on a refuse pile, as is so commonly done in America. The army needed enormous amounts of fuel; the problem was not that of finding a market, but of securing labor to handle the material and cars in which to make shipments. A blast furnace and iron foundry, which had been in operation for one hundred twenty years at Pontenx, was working at capacity to produce shells for the Allied armies. This plant needed a lot of charcoal and wood, much of which it was shipping in by rail for considerable distances. A satisfactory deal was arranged with this company, under the terms of which the Americans obtained a splendid tract of standing timber, and the munitions company received all of the fuel wood in tops and branches remaining from the logging operations, and all of the slabs and edgings not needed for local consumption. The company furnished all of the labor to handle the material, part of which was made into charcoal before it was hauled to the munitions plant.

SCOUTING FOR TIMBER IN THE EASTERN PYRENEES

BY MAJOR R. Y. STUART, 20th ENGINEERS (FORESTRY)

THE general American impression of French forests is that they are like American parks in appearance and that their products are so readily accessible for transportation and utilization as to give value to the smallest twig. This idea is not unfounded since in most parts of France these conditions are representative. One is apt particularly to reach this conclusion if he does not leave the usual course in rail and road travel. But there are parts of the country, devoted to tree growth, which are less accessible and sustained a greater shake up in formation than those more usually seen by the tourist. Units of the 20th Engineers operated in parts of the Vosges, Jura and Central Plateau that brought to their minds vivid memories of overhead skidders and donkey engines employed on their last jobs in the States, methods which permit ready handling of the products and large outputs but not recognized in France as suitable companions for forest protection.

As the demand for timber among the Allies increased it became necessary to investigate the situation in every part of the country regardless of the question of accessibility,

which, it must be conceded, is a relative factor. Lacking boats and other transportation to bring timber to France every available tract became a prospective operating chance. Tracts which previously had been passed up as too inaccessible or difficult to exploit loomed large as possibilities within which to place a mill and crew. Any job that was practicable from an operating standpoint was booked for a coming forestry engagement. Opportunities of their kind were not lacking in that the Americans having been late comers and bearing a reputation for tackling difficult industrial problems brought up for consideration as logging chances tracts which were accumulating surplus growing stock on account of their relative inaccessibility.

It had been determined by preliminary inquiry and investigation that there were some excellent stands of timber in the Pyrenees, the Aude and Tarn, and the Alps regions, but their general location in relation to the points of use made them unattractive so long as the mills and men available could be kept engaged in more accessible operating centers. The rate at which the Americans



QUILLAN, AUDE, IN THE EASTERN PYRENEES. THIS IS A GENERAL VIEW OF THE TOWN AND THE TIMBER DENUED HILLS NEAR IT. THERE IS, HOWEVER, A LARGE SUPPLY OF GOOD TIMBER A SHORT DISTANCE FROM THE TOWN

landed and added to the already large demand for timber in the summer of 1917 necessitated further and more careful consideration of these and other outlying regions as operating points. Accordingly, arrangements were made to scout for prospects throughout all of the Southern Departments. To Captain P. A. Wilson, an experienced British Columbia logger and mill man, and the writer was assigned the mission of covering the Departments adjoining the Mediterranean from Toulouse, east to the Italian line.

The most interesting prospect reported was on the Espezel Plateau, near Quillan, Aude. Captain R. C. Hall had been in that section in the early spring on a preliminary reconnaissance from which it had been determined that the question was not whether the timber was there but rather whether it could be gotten out. Quillan is snugly situated on either bank of the Aude River, a short distance from its entrance into the gorge which it had carved for itself en route to the sea. From the town, surrounded by massive ranges, the timber situation did not look promising, but we were assured by the townsfolk that the prospect lay on the plateau above Quillan.

A climb of 1,500 feet in 7 miles with an average grade of 4 per cent and numerous hairpin turns did not brighten our hopes of making a find. From the edge of the plateau one secured a general view of the timber possibilities. Bounding the Espezel Valley were extensive ranges well timbered and apparently directly accessible from the valley floor. Our automobile indicator registered 22 kilometers (14 miles) from Quillan, the nearest railroad point, when we reached the most accessible

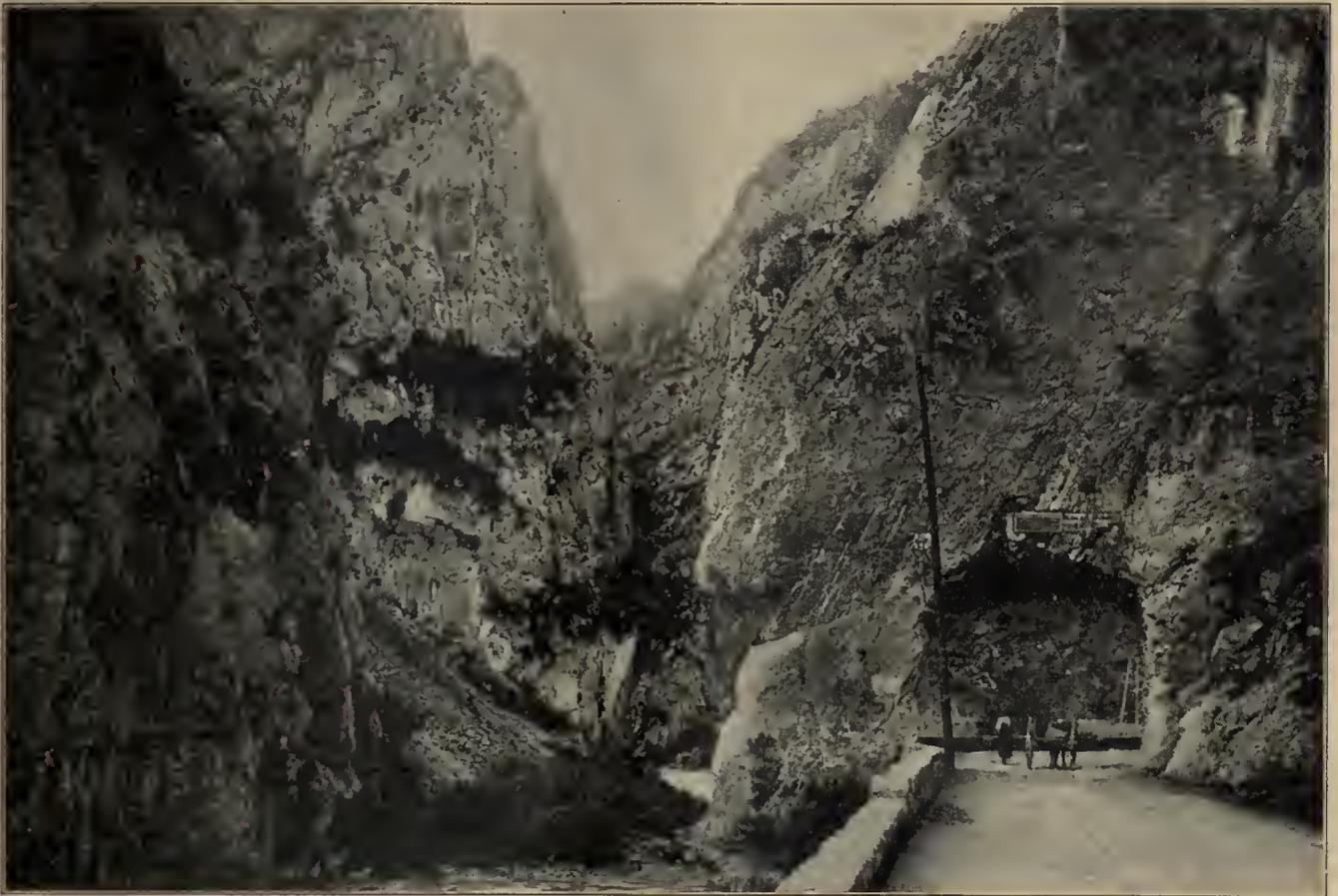
range. While the climb to the plateau and the distance to the shipping point continued to loom large in our calculations they were discounted somewhat when we gave attention to the timber itself. Others had also been impressed with the seriousness of the transportation factor for in no other way could one account for the retention of such fine stands in France. On the ranges encircling the plateau were exceptionally fine bodies of fir suitable in size and quality for the various war demands, including large products such as piling and structural timbers, so difficult to secure. We learned from the French foresters that a cut of approximately 194,000 cubic meters (48,500,000 feet B. M.) could be secured from the State Forests in the group in strict conformance with the customary French cutting methods. This cut represents roughly the yield from these forests for four years. To an American forester in Army khaki visiting them after the spring drive of the Boche it appeared that a cut of twice the amount estimated would leave the forests well prepared to supply timber against the needs from future Boche onslaughts.

The trees were well cleared and symmetrical, ranging from 12 to 36 inches in diameter, from 100 to 300 years in age, and from 80 to 125 feet in height. We observed some areas which would cut 60,000 feet B. M. to the acre. One veteran of at least 48 inches in diameter and 135 feet in height was gaudily marked with a wide band of red paint, a mark of respect to his age and size. The Forest Brigadier expected all visitors in the region to go and see it. Some fungus and unutilized windfall, which are uncommon in French forests, were observed. Logging conditions were variable, the surface varying from

gentle and rock-free to boulder strewn and, in cases, precipitous slopes. As a whole it was, as Captain Wilson expressed it "Some logging chance."

We were convinced that the timber was there but the question of how to get it out was unanswered. That this could be done, and profitably, was evidenced by the fact that Spanish civilian contractors were hauling out four cubic meter (1,000 feet B. M.) loads of logs per trip to Quillan, from 20 to 35 kilometers (13 to 22 miles) distant, at from 25 to 35 francs per cubic meter. An average of two trips in three days was made, giving a return of approximately \$28 per M feet B. M., or \$19 a day. A pair of stout oxen, a heavy two-wheeled French

the logs from stump to mill. A railroad was dismissed because of the heavy and expensive rock work entailed in reaching the plateau with consequent extended period of time for completion. The established road bed was too narrow and tortuous to permit a narrow gauge installation. There was no favorable location for an incline, such an artificial arrangement not having been provided for by nature in forming the topography. A cable, well installed, would work to advantage if cable were available, but cable was as scarce in France as bon-bons. So it narrowed down to a horse job for the woods and motor trucks for the haul to the railroad point, with the oxen and two-wheeled carts as a reserve. The disappointment of the writer is



SO NARROW IS THE GORGE THROUGH WHICH FLOWS THE RIVER AUDE, NEAR QUILLAN, IN THE EASTERN PYRENEES, THAT THE ROAD HAD TO BE TUNNELLED THROUGH THE ROCK

cart and plenty of "vin rouge" in a goat skin sack constituted the transportation equipment. At first blush the method seemed antiquated and inefficient but after observing the manœuvring of animals and loads through and over almost impassable places for stock one was forced to the Ford conclusion that "it takes you there and gets you back." My belief was that, all factors, including cutting restrictions, considered, a copious supply of oxen, two wheeled carts, "vin rouge" and select Spanish woods phrases would be the most economical transportation method for the operation.

The American mind naturally turns to machinery to assist in meeting engineering problems and the examiners in this instance were not exceptions. Railroad, incline and cable were all considered as a means of transporting

that he could not have seen the competition which would have ensued between the Spanish and American contestants for the road and capacity loads.

The next prospect for investigation was some fir timber on the State Forests of Hares and Carcanet, about 20 miles above Axat on the Aude River. One follows the gorge previously mentioned in reaching these forests from Quillan and is more impressed with the attractiveness of the country to the tourist in search of rushing streams and precipitous slopes than to the timberman in search of a mill prospect. Our earlier experience, however, had taught us to reserve our decision until we were actually within the forest.

The Hares and Carcanet were not so desirable as the forests in the Quillan group, but to those in need of

timber they offered the opportunity of securing excellent material. The French foresters estimated that under their customary methods of marking for the type a cut of 86,000 M³ (34,000,000 feet, B. M.) would be secured, representing in this instance a cut of 90 M³ per hectare (9,000 feet, B. M., per acre). The average tree approximated 20 inches in diameter and 70 feet in height, and of lower quality than at Quillan. Defect was more noticeable. The surface was exceedingly rough and uniformly steep, which, with a lack of substantial forest roads, made the forests very questionable for operating except under war conditions. Some patient and thrifty Frenchmen were engaged in hauling logs from the vicin-

growth. If his offer was in good faith he merits the sympathy of his countrymen; if made in bad faith he has since learned that the buying of timber by the A. E. F. was not wholly a paper transaction.

We learned of a tract of mountain pine near Mont Louis, Pyrenees Orientals, reported to contain from 80,000 M³ to 100,000 M³. Our trip to the tract from Axat was not without interest in that we picked up two French gendarmes en route to the nearest telephone, 12 miles, to report the escape of two Boche prisoners, who, presumably with a Spanish confederate, were headed for the border. It may be remarked that even under the favorable chances for concealment in the mountains of



ANOTHER VIEW OF THE TERRITORY AROUND QUILLAN, IN THE EASTERN PYRENEES. THE TIMBER IS MOSTLY ON THE HIGH PLATEAU NEAR THE CITY

ity to Axat with oxen, making two trips a week. The plan of operation outlined for the A. E. F. was to skid and haul the logs by carts to the main road where the logs would be loaded on the tractors or trucks for the haul down the canyon to the proposed mill site at Axat.

An amusing, yet provoking, incident in connection with our timber examinations near Axat was an offer for sale of 3,000,000 M³ (750,000,000 feet, B. M.) by an enterprising American who apparently wanted to do his country a bit. His claim of title covered a scope of country worthy of a favored nobleman. Vigorous mountain climbing and the use of field glasses revealed the fact that the only merchantable timber within the area defined was that on the forest of Hares and Carcanet, title to which had passed to the State 20 years ago. The remaining area was mountain tops, gorges and slopes with scrub

that region the odds are strongly against the Boche having escaped the vigilant gendarmes.

The timber department of the French Army (Centre de Bois), had already secured a liberal cession of the mountain pine and were engaged in operating it when we reached there. We were informed of a controversy which had arisen out of the cession, the Commune and the National Forest Service (Department des Eaux et Forêts) disagreeing on the extent to which cutting on the forest, which was Communal, should be permitted. The Commune insisted that the timber be clear cut so that the land could be devoted to agricultural use. The Forest Service was equally insistent upon conservative cutting and the retention of the land for timber production on the ground that the balance between agricultural and timber land in the region should not be disturbed. The

latter, supported by higher authority, won out.

Believing that the Quillan, Hares and Carcanet tracts would afford a sufficient opening for Pacific Coast loggers to establish European reputations and put them in shape to exhaust the further possibilities of the region, we went in search of hardwoods to appease the woods appetite of our Eastern and Southern logging contingents. An offer of some beech and oak from the State forests of Cayroulet, Hautaniboul and Ramondens had been received which looked very promising as tie prospects. These forests form the greater part of Montagne Noire on the boundary between the Departments of Aude and Tarn. The old city of Carcassonne with its massive walls and towers is the historic landmark of the region. The "cite"

was to clear cut but the French were unwilling to practice this method further until the results of experiments under way were known. About 10 years ago clean cutting on limited areas had been made and fir planted, on the ground that the value of fir in the region was greater than beech and oak. The plantations were thriving, giving every promise of success.

The stands varied in size considerably under the system of management followed, which provided for periodic fellings whereby succeeding age classes were thinned and developed to maturity serving in turn as a nurse to succeeding stands. The fight against the encroachment of holly was waged by requiring each timber operator to grub out the holly on the area from which he purchased



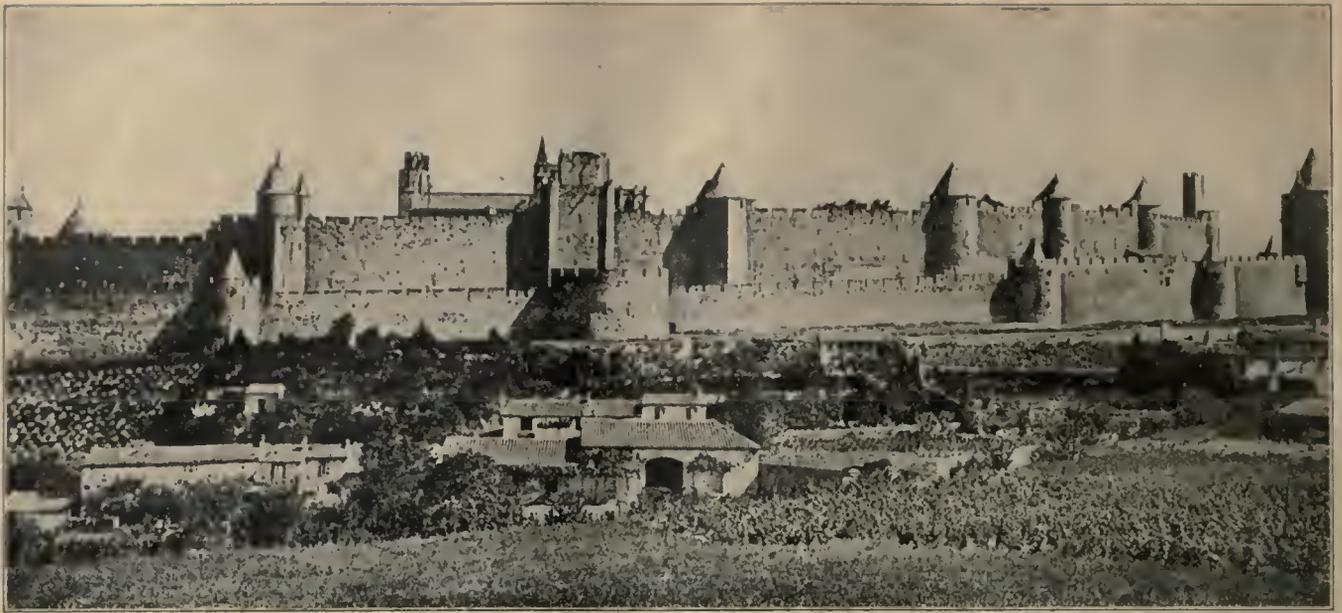
A WILD BOAR (SANGLIER) HUNTING PARTY NEAR QUILLAN, IN THE EASTERN PYRENEES. THE WRITER OF THIS ARTICLE, MAJOR R. Y. STUART, 20th ENGINEERS (FORESTRY) STANDS ON THE EXTREME LEFT

and Montagne Noire attract many tourists in normal times; the former at the time of our visit was a confinement camp for some German officials.

The demand for ties on the part of the Allies seemed insatiable, and for this purpose hardwoods were eagerly sought. Normally one would secure ties, of pine if necessary, from more accessible areas than Montagne Noire, but under pressure of war demand the Montagne Noire prospect looked exceedingly good. Eliminating portions of the forest which presented transportation problems incommensurate with the quantity of timber to be secured a cut of 18,000 M³ (4,500,000 feet, B. M.) was assured under the French system of marking. While a much heavier cut without injury to the forests seemed possible it was explained by the foresters that the encroachment of holly in the openings would follow a more severe cutting. The alternative to secure a heavier cut

the timber. Had the A. E. F. operated on these forests it would have been necessary for it to expend the time of 100 men for 30 days on this work or compensate the French Forest Service 30,000 francs for having the work done. With such care it is small wonder that beech 2 feet in diameter with a clear length of 40 feet and without defect was being produced.

It proved unnecessary to begin operating in any of these regions, the summer drives of the Boche having developed into a boomerang by early fall, terminating in the procurement of a supply of timber to meet the needs of the Army of Occupation from German forests and a freer movement throughout France of material already produced. By December 1, the stage was reached where mills were being dismantled and arrangements made to wind up our timber affairs. Many of the men who, under



THE OLD CITY OF CARCASSONNE, WITH ITS MASSIVE WALLS AND TOWERS, IS THE HISTORIC LANDMARK OF THE REGION NEAR QUILLAN. WHEN THE WRITER WAS THERE IT WAS USED AS A CONFINEMENT CAMP FOR SOME GERMAN OFFICIALS

other circumstances, might be shouting at oxen yoked to two-wheeled carts on the Quillan grade or grubbing holly on the Montagne Noire are seeing the picturesque Pyre-

nees and the historic old city of Carcassonne on leave of absence. It may be that some of them are in citizens clothes in the States.

TRANSPLANTING LARGE TREES

LARGE trees are always transplanted with considerable difficulty and expense, and are far less likely to survive the operation than smaller ones. If trees above three inches in diameter are to be moved, it is best to have the work done by some one who has had experience in transplanting large trees. The most successful results are accomplished by means of a tree-moving machine. Such machines are made by at least two firms in the United States viz., John A. Wilkins, Indianapolis, Indiana, and Isaac Hicks & Son, Westbury, New York. With these machines, trees having a diameter as great as twelve inches can be safely moved.

To those who may wish to attempt the transplanting of trees without engaging the services of an expert, the following suggestions are offered:

In the fall, before the ground freezes, a trench should be dug around the tree which is to be moved, and as deep as the roots have taken hold on the soil, usually three to four feet, leaving a ball of earth from three to seven feet in diameter, depending on the size of the tree and the development of the root system. At the same time a hole should be dug where the tree is to be planted, making it deep enough so that the tree when planted will stand three to four inches below its original level, and large enough to allow the filling in of one to two feet of good rich soil about the roots after the tree is placed in position. To prevent freezing, both the hole and the earth dug from it should be covered with straw.

When the ball of earth has frozen the tree is ready to be moved. The smaller trees may be moved by rolling the ball of earth on a sledge or stone boat, the stem being supported upright to prevent injury to the limbs,

in which position it may be drawn to the place of planting. The ball of earth on larger trees should be raised to the surface by repeatedly leaning the tree to one side and filling in under it with earth on the other. The crown of the tree should then be lowered to the ground and the ball rolled on a long sledge or stone boat by the aid of horses. The trunk should be held free from the ground by means of wooden horses or supports placed on the rear of the conveyance. The limbs should be tied up to prevent injury in transportation. In all these operations plenty of burlap or other material should be used to prevent damage to the bark. Horses may again be used to roll the ball into final position and raise the stem upright.

In all cases the soil should be firmly packed about the roots of the transplanted tree. To prevent their being thrown by the wind, the larger trees should be supported by three or four guy ropes, which should not be removed until the tree has become firmly rooted in its new site.

It is very important that trees transplanted in this way should be watered during periods of drought for the first two or three years, or until the equilibrium between the root and branch systems, disturbed by the transplanting, has been restored.

An experienced tree-mover states that of all our trees, the elms are most likely to survive when moved at a mature age. Other trees which may be more or less successfully transplanted are the maple, horse chestnut, catalpa, ash, linden, willow, poplar, and pin oak. Trees grown in the open are much better to move than those grown in the woods, and a large young tree is more likely to succeed than an old one of the same size.

CANADIAN FORESTRY CORPS WORK IN FRANCE

BY ROLAND HILL

(Canadian War Correspondent)

OF THE many experiences in quaint places in which the Canadians found themselves doing war duty those of the Canadian Forestry Corps can claim almost prior place. In 1917 Britain, France and Italy were all appealing for lumber—and more lumber. The Allied forces in Salonika were crying for it in the worst kind of way. Russia offered a supply if cutting could be organized. So into the four corners of Allied Europe were sent Canadian timber cruisers, men who had foraged through Northern Quebec, Ontario and British Columbia. Some of them could speak no language but their own, but they knew what they were after, and they could tell to the thousand how many billion feet could be cut from a forest. At one time, after three Ontario men had cruised Crete and Mudros, a Canadian mill outfit was started on its way to the picturesque Mediterranean. But the Royal Engineers decided to do the job and the Canadians were robbed of one of their quaint experiences. Parties were sent to Russia and were about

to start operations when the distant rumbles of the revolution were heard and they were withdrawn.

The best record of the Canadian Forestry Corps, outside that done for the British was the supplying of every class of lumber direct to the French Armies from the Vosges and Jura Mountains on the Swiss border and from the Landes and the Gironde, south of Bordeaux, in sight of the Pyrenees. In the north Canadian uniforms came to be known in the quaint mountain villages, and the peasants opened their homes to the strange men from across the Atlantic. Down in the Landes, where reigned a "dolce far niente" almost Spanish, the vigor and expedition of the Canadian wood choppers was an unceasing marvel. Some of the Canadians from Acadia found distant relations of the same names through Cabot and Cartier in the mountaineers of the Jura.

One day in the early spring of 1917, two Canadian officers chatting with the engineer of the Paris-Switzer-



CANADIAN ROADMEN KEEP THE FOREST TRAFFIC WAYS IN GOOD CONDITION

land express told of the big engines that drove the Canadian Pacific trains over the big grades of the Canadian Rockies. They were critical of the toy French engines. They were invited to take the trip over the border into Pontlarlier, the sentinel town of the international border. On they climbed, and when the end of the run was reached, two begrimed, but happy beings climbed off the engine honorary members of the French Railwaymen's Union. One man worked the engine up the winding grades and the other had stoked. One was a professor of Mechanics at McGill University, and the other was chief engineer for one of the biggest lumber companies in Ontario. That was the kind of material of which the Forestry Corps was made.

When the timber famine came along the fighting fronts of Europe, the extreme east of the French lines and fortresses like Belfort were pleading as urgently as the rest. There were huge forests but no material or men to cut them fast enough for military needs. Heavy timber meant the saving of Frenchmen's lives, so a bargain was struck that treble the amount cut and delivered by the Canadians in the Vosges and Jura, for the French armies would be delivered in standing timber near the British lines. In two weeks boilers and mills from the far away Dominion were installed in the mountains. The railway officials were their friends, and loading sidings were blasted out of the solid rock cuttings through the mountains. The peasants, who formerly cut the

big trees, used to slowly bring them down the mountain roads by ox teams into the valley town where there were ancient mills driven by water wheels. Ten trees a day was a good average for the mill to saw.

Then the Canadians came on the scene. There were many engineering difficulties to overcome. The supply of water for the big Nova Scotia boilers was solved by their own men and miles of piping were laid that defied gravity by artful pumping. Light railways were built through the forests and mud roads were macadamized by mountain rock which was crushed by our own outfits. In the various mills at the end of the war the output of all sizes of timber had reached 400,000 feet daily, more than the whole Jura produced in the year before hostilities broke out. Fifteen or twenty mills of Canadian type

were distributed at strategic points—anyone coming on the scene might have thought themselves to be in Northern Ontario, or British Columbia. The clever engineers of the Forestry Corps were always willing to help the villagers. They showed them how to harness the rushing streams that irrigated the vine-clad slopes, and turn them into power for electric light or to run their wine presses. One Canadian major who had been in the wooden pipe business on the Pacific Coast gave up his trade secrets in the fraternity of war-time, and water systems were started in villages that for centuries had dipped buckets in the communal stream.

In the south of France the huge pine forests which Napoleon planted for the peasants yield them fortunes

in resin and turpentine. It is estimated that the value extracted from each tree per year is five francs. But in forty years the tree goes sterile, and there were millions of these trees ready to be cut into railway sleepers, and inch planks badly needed for the war. The French Government had difficulty in buying them from the unsophisticated peasants. A government official went with a Bank of France cheque to close a deal with one old forester near the Spanish border. It was for a quarter of a million francs, and a fortune for the old man. He tore the cheque up as worthless; he could only think in tree values, not in coinage. For several weeks the deal hung fire, and then he exchanged the sterile forest for a productive one fifty miles away, asking as his profit one hundred ex-



CABLE RAILWAYS BRING DOWN AN UNENDING SUPPLY OF LOGS IN THE VOSGES

tra trees. The rapidity with which the Canadians cut the forest amazed the Frenchmen, who called them the "madmen of Canada." They were all good friends, though, and hundreds of the poor folks who had never had the services of a doctor or been in the hospital were treated free by the kindly surgeons attached to the corps. As in the Vosges and Jura, the Canadians who worked in the Landes and Gironde also left the mark of the new world when peace called them back to Canada. The hospitals remain and funds have been raised for a French staff to keep them going. New railroads built by the men from overseas link up hamlets that never thought to see the ribs of steel. It was a quaint experience for the men from overseas, and it was a strange temporary awakening for the people of the Landes.

MEMORIAL TREES

THE MEMORIAL TREE, "the tree that looks at God all day and lifts her leafy arms to pray," has become the tribute of the people of the nation to those who offered their lives to their country in the Great War for civilization. In the tree planting the people find opportunity to express their love of him for whom the tree is planted. But the planting is not confined to doing honor to war heroes. Indeed the reports to the American Forestry Association show the people have seized upon tree planting as the finest way to mark centennials, important events in church history, the date of town foundings and similar events. The United States government has just placed its approval on memorial tree planting with the announcement that Memorial Trees will be planted in West Potomac Park near the famous Lincoln Memorial in Washington. The American Forestry Association made the suggestion for planting of memorial trees the day the armistice was signed and since that time tree planting has been taken up all over the country.

To the Christian Endeavor Societies of the World the Rev. Francis E. Clark has sent a call for memorial tree planting, not alone in honor of war heroes, although thousands of churches are planting trees in honor of members of congregations who offered their lives to their country when the call came, but in honor of famous pastors, leaders in church work and to mark important dates in a congregation's achievements. This call has resulted in giving tree planting a great impetus not only all over the United States but all over the world. In the schools and colleges of the country tree planting has been taken up as the means for keeping green the memory of graduates in war work. Georgetown University, at its 130th Commencement, planted 54 Lombardy poplars, one for each of her sons who gave his life to his country. These trees are marked with the bronze markers designed by the American Forestry Association. The National Farm School near Philadelphia has consecrated a "Patriotic Grove" in which are planted trees for her war heroes, friends of the school, and "Festive Trees" marking dates of births, confirmations, betrothals and wedding anniversaries. This form of tree planting will doubtless spread for it is easily seen what a tree will mean to a man or woman if it was planted to mark their birth. It is the same idea that is prompting many college classes to plant memorial trees when entering or leaving a school.

One of the most pretentious plans undertaken in tree planting was at the U.S.A. Balloon School at Fort Omaha, Colorado. Col. Jacob W. S. Wuest has directed the plant-

ing of about six thousand trees. Of this number nearly one thousand are in memory of men who passed through that camp and the one at Fort Crook, and died in the service. The unique feature about this is that the planting was done with the proceeds of "The Gas Bag," the official publication of the balloon school. The next of kin are marking the trees with the bronze marker of the American Forestry Association and registering the trees on the Association's national honor roll. The first chapter of the Daughters of the American Revolution to plant a memorial tree is the "Our Flag" Chapter of the District of Columbia. The tree was planted at the home of Mrs. Laura C. O'Hare. The League of American Pen Women was the first woman's organization to plant a tree in the District. This was planted at the home of Mrs. George Combs.

In Golden Gate Park, San Francisco, a "Hero Grove" has been planted in honor of the California heroes of the war and at Camp Kearny, near San Diego, the Coloradoans of San Diego are planning to plant memorial trees in honor of the Colorado soldiers who passed through that camp. In the planting of trees to mark an important date, the Memorial Tree at Camden, New Jersey, is perhaps the most interesting. The tree was planted to mark the 100th birthday anniversary of Walt Whitman, the "good gray poet," by the Whitman Park Improvement Association. But tree planting has spread around the world. The Ardlethan public school in New South Wales has planted memorial trees in memory of each



This bronze marker for Memorial Trees may be obtained from the American Forestry Association. It costs \$1.00. Send the name and regiment of the man for whom the marker is desired.

Ardlethan soldier and in Queensland 30,000 trees have been planted in Anzac Park. Of this number 16,000 are for men who gave their lives at the call of the Mother Country.

Another phase of tree planting with great possibilities is the planting of trees along the motor highways of the United States. Make these highways "Roads of Remembrance," says Charles Lathrop Pack, president of the American Forestry Association, who has issued a call to every county to co-operate with the road builders. This "Roads of Remembrance" idea is being furthered in Great Britain by an organization of which Millicent H. Morrison is the secretary. The United States Army Motor Transport Corps now has a motor train crossing the country from Washington to San Francisco. Millions of dollars have been voted for good roads.

With this in mind and the Army demonstration underway thousands of people are expected to urge beautifying these roads by the planting of memorial trees.

MEMORIAL TREES ARE BEING PLANTED BY



Photo Underwood & Underwood
 In Bedford Park, Brooklyn, Boy Scouts plant trees in honor of Col. Roosevelt.



Whitman Park Improvement Association plants a Memorial Tree in honor of Walt Whitman at Camden, N. J. to mark the centennial of the poet's birth.
Photo Public Ledger



Photo by J. R. Clarke.
 Agricultural Classes of Fremont, O., High School planting Memorial Trees.



At Gorham, N. H. eight Memorial Trees were planted following a parade.



Photo Kimble
 Boy Scouts of Trenton, N. J. plant 50 trees in honor of Theodore Roosevelt.

COLLEGES, MUNICIPALITIES AND INDIVIDUALS



Photo Harris & Ewing
Georgetown University plants 54 Lombardy Poplars in memory of her sons who gave their lives to their country. The trees were marked by the American Forestry Association and registered on its national honor roll.



Planting the first pine tree in "Hero Grove" Golden Gate Park, San Francisco, and firing salute over Obelisk when "Hero Grove" was planted. The Obelisk had been buried beneath wreaths of remembrance sent by mothers and widows of California's heroes. *Photo San Francisco Examiner*



NATIONAL HONOR ROLL MEMORIAL TREES

Trees have been planted for the following and registered with the American Forestry Association, which desires to register each Memorial Tree planted in the United States. A certificate of registration will be sent to each person, corporation, club or community reporting the planting of a Memorial Tree.

Cordele, Georgia—John L. Gunn and J. B. Ryals, by United Daughters of the Confederacy.

Washington, District of Columbia—Soldiers and Sailors, by "Our Flag" Chapter, D. A. R.

Godfrey, Illinois—Ovid Radcliffe, by Summerfield School.

Sterling, Illinois—Merrill Benson, Harry Heisman, Byron Lancaster.

White Hall, Illinois—Francis Grimes, by White Hall Senior High School—John Moore, by Junior High School—H. D. McCracken, by White Hall Schools—James M. Lyons, by White Hall Music Club.

Collamer, Indiana—Boys of Collamer, by the school.

Huntington, Indiana—Carl Grossman, Harry Satterwaite, Graham Scott, Elizie Erehart, Earnest Slocum, Alden L. Haller, Charles Beard, Charles Whitelock, Robert Mayne, Carl Timmer, Charles A. Smith, Hugo Taylor, Edward D. Hoover, James Sheller, Floyd Stuart, Garland Robbins, Elmer Fyson, Edward Hasty, by the Women's Civic Improvement League.

Skowhegan, Maine—Twenty-sixth Division, by Reformatory for Women.

New Bedford, Massachusetts—Theodore Roosevelt, by New Bedford and Fairhaven Council of the Boy Scouts of America.

Waltham, Massachusetts—Charles C. Bacon, by First Parish Church.

Detroit, Michigan—Lieut. Col. G. B. Walbridge, Major Edwin Denby, Major John H. DeVisser, Capt. E. C. Barkley, Major Geo. C. King, Major W. C. Cole, Capt. Wm. Lawrence, Lieut. C. F. Clarke, Lieut. A. A. Leonard, Sergt. Jos. Durand, Jr., F. J. Campbell, A. A. MacDiarmid, A. N. McFayden, F. J. Robinson, S. W. Wirts, Irvin Long, T. G. Phillips, and A. G. Pittelow, by Detroit Rotary Club.

Tipton, Michigan—Paul Gilbert and C. L. Bailey, by Spring Brook Lodge, K. of P.

Gorham, New Hampshire—E. J. Bourasse, J. A. Guerin, N. P. Castonguay, Ernest Dupont, G. H. Wentworth, C. W. McGown, O. C. Reid, and W. S. Holmes, by Gorham Women's Club.

Belleville, New Jersey—Michael A. Flynn, Thomas J. Mooney, Michael J. Murry, Harry C. Hoag, Charles A. Schaffer, Harry Blekiski, Fred W. Stockham, Charles McGinty, by St. Peter's Parochial School—W. S. C.

Bain, Jr., and H. M. Garside, by High School—Theodore Roosevelt, by School No. 5—George Eyre, George S. Smith, by School No. 1.

Elizabeth, New Jersey—Former Pupils of William Penn School, by William Penn School—Theodore Roosevelt, by Public School No. 12—Michael Gagliardo, Edward Corris, Benjamin Brower, by Public School No. 6—Former Pupils, by Philip Carteret School.

Hackensack, New Jersey—Albert A. Kleiber, by First Baptist Church.

Harrison, New Jersey—Charles E. Shanaburg, Donald Pegg, Thos. Krotik, Frank Policastro, Howard Quinn, Oscar Grell, by Edison Lamp Works.

Cohoes, New York—Peter Charles Allery, William J. Burns, John J. Blanchette, John R. Bickley, Alphonse Briere, Charles F. Cunningham, Eugene Clements, Anthony Curro, John B. Durocher, Timothy F. Fennen, Sebastiano Guglielmo, Joseph Gadoua, Grover C. Jackson, Harold W. Jewett, John Johnston, Ernest A. Jewett, John Jamieson, Thomas A. Jones, George A. Kelley, John A. Kilfoyle, George B. Lambert, James J. B. Lighthall, Patrick Molesky, Thomas F. Manley, Frank E. Plumley, Edward Pilawski, Arthur Palin, Charles R. Rowan, Joseph A. Ryan, William J. Rafferty, Edward T. Ruane, William J. Rocheleau, James B. Soden, Arthur V. Soden, Thomas C. Surprise, George Turcotte, Clarence Van Wagner, Walter F. Van Derker, Charles Edward White, Raymond P. White, Dr. Clarence H. White, Robert Manogue, Edward Julian, George Burke, Leo M. Karanaugh, by Woman's Municipal Welfare League.

Delhi, New York—Eric S. Dumbell, by H. M. Dumbell.

Reading Center, New York—Foster F. Jessop, Leon C. Smith, by Study Club.

Ashtabula, Ohio—Harry Kochenderfer, John Green, Homer Dye, Casper Robert Keeney, and Fred Niles, by Ashtabula High School.

Canton, Ohio—Earl Dister Dobbyn, by the East Canton School.

Cincinnati, Ohio—General Foch, General Pershing, Joffre, Tim Willie, William Kluber, Field Marshall Haig, Edward Rickenbacher, Edward Roseler, Admiral Sims, E. McFarland, "Our Dead," "Heroes of Italy," King Albert, Woodrow Wilson, Ralph Wilkerson, Isador Dube, George Hedge, John Jentz, Quentin Roosevelt, William H. Taft, "Old Tiger," Gen. Peyton C. March,

Theodore Roosevelt, by the Opportunity Farm School—William Carter and Carl Koblinsky, by Mt. Airy School—Walter Hawk, William Bailey Gentry, by the Mt. Lookout Business Men's Club—Jacob Waechter, Alvin F. Zorb, F. A. Benzinger, W. H. Sohn, and Herman Koenig, by Vine School—Albert Bauer, Robert Baum, Edward Sauer, William Strietelmeyer, William Ritter, Chester Price, William Painer, William Bierhorst, William Wagner, by Washington School—Walter Volkert, William Nippert, Theodore Roosevelt, by Winton Place School.

Goshen, Ohio—Louis Griffith, Edgar Cole, Guy Felter, Lewis Irwin, Floyd Waite, Clayton Fox, by Goshen Centralized School.

Marion, Ohio—Mrs. Mary A. Ruehrmund, Frederick Herman Harzer, Miss Elizabeth S. Ruehrmund, Mrs. Renata Ruehrmund Hinds, by Clara Ruehrmund.

Berwyn, Pennsylvania—Lieut. Thomas L. Bolster, by Mrs. Thomas L. Bolster.

Boalsburg, Pennsylvania—Alfred Calvin Witmer, by I. O. O. F.—William F. Taylor, by the Red Cross—Guyer Eugene Durst, by the Civic Club.

Huntington, Pennsylvania—Corp. F. D. McEwen, Oscar P. Beck, Frank Palmer Hormmon, William Lister, William P. Spyks, Robert Bruce Houstine, W. Preston Kurtz, Howard Wise, Clair L. Hicks, Joseph F. Robison, Clarence E. Focht, Antonio Mardelli, by Ladies' Civic Club.

Middleburg, Pennsylvania—Joseph Covert, Jackson U. Fessler, John H. Gundrum, William D. Hackenburg, John A. Hartman, William J. Hartman, Corp. E. H. Hottenstein, Samuel O. Lauver, Erman E. Lepley, Corp. John H. Miller, Roy A. Musser, Corp. George L. Mulliner, Walter Page, Lieut. Wendell J. Phillips, Miles A. Renninger, Samuel M. Rine, Sherman I. Rowe, Sgt. Brewster C. Schoch, Grover Sholl, Hiram C. Steffen, Jr., Lieut. John W. Stepp, Ernest E. Stine, Ralph C. Spaid, Henry H. Sprengle, Charles Treaster, Boyd M. Warner, Theodore Roosevelt, by Shambach and Wagenseller.

St. Davids, Pennsylvania—Lieut. Wm. H. Sayen Schultz. One tree each by Emilie Sayen Schultz, Wayne Presbyterian Sunday School, Civic Club on Philadelphia Parkway.

Brownsville, Tennessee—Soldiers and Sailors of Haywood County, by Brownsville Civic League.

Nashville, Tennessee—Lieut. James Simmons Timothy, by Catholic Women—Lieut. John W. Overton, by Robertson Academy.

Cherrydale, Virginia—Frederick Wallis Schutt, by Ellen S. Wallis.

Appleton, Wisconsin—William Hageman, August Zuleger, Raymond Neuenfeldt, Raymond Kluess, by Zion Lutheran School.

THE WISHING TREE.

By J. R. Simmons.

This photograph shows the possibilities of the American or white elm as a memorial tree. The man who "constructed" this tree as an entrance to his home was laughed at for his pains, but time has demonstrated that



his faith was not misplaced. He took four sapling elms and planted them in a group, binding them together about twelve or fifteen feet from the ground.

In time the trunks grew together, giving the appearance of a single tree "on stilts." It is known as the "wishing tree," and small boys and girls in the locality believe that by walking in and out among the four legs of the trunk, a wish made in the process will come true.

The tree stands near the state highway in the town of Bridgewater, Massachusetts.

THE OLDEST tree on earth, at least as far as anyone knows, is the Boo tree in the sacred city of Amara-poorah, Burmah. It was planted, the record says, in the year 288 B. C., and is, therefore, about 2200 years old. Its great age is proved by historic documents, says Sir James Emerson, who adds: "To it kings have dedicated their kingdoms in testimony of a belief that it is a branch of the identical fig tree under which Buddah reclined at Uoa, when he was undergoing his apotheosis." Its leaves are carried away by pilgrims as relics, but, as it is too sacred to be touched, even with a knife, they can only be gathered after they have fallen.—New York Commercial Advertiser.

PHOTOGRAPHING FORESTS FROM THE AIR

BY LIEUT. LEWIS, R. A. F.

SO FAR as I know, air photographs have not been used up to the present, for other than war work, and my experience with them has been entirely in that sphere. Such marvelous results were obtained from them during the course of the war, particularly during the latter part, when planes, cameras and operators were more efficient and ground interpreters became more familiar with their work, that I think it is the duty of those of us, who became experienced in their use, to pass that experience on to those in commercial life, who are most likely to find it of value. The timber industry seems to me to be one in which their use has great possibilities.

For about a year of my stay in France, I was employed in the Intelligence Department, and among my duties was the interpretation of aerial photographs and the transferring of information thus gained, to our maps. Of course we already had maps on the country as it was before the war, but the defensive works constructed on both sides

would have necessitated elaborate surveys which, of course, it would have been rather dangerous to attempt in the vicinity of the front line trenches. By experience we learned to know the appearance on a photograph of the numerous defensive works in the enemy lines, trench systems, machine gun emplacements, trench mortar emplacements, gun pits, dug outs, wire entanglements, telephone lines, buried cable lines, and many other constructions became known to us, and the result was that our artillery could deal with these things, and the Canadian artillery have a decidedly efficient way of dealing with things that are bothering their brothers-in-arms, the infantry.

The average height from which these photographs were taken was from 6,000 to 8,000 feet. Now, if such accurate

results could be obtained at these heights how much more could be done with photographs taken, say from 1,500 feet, with nothing to ruffle the nerves of the operators?

I understand that the Government is to establish an aeroplane or hydroplane forest patrol for fire ranging purposes. Why not have these planes fitted with photographic outfits for the purpose of mapping that part of the country of which so little is known? The importance of it to the lumber industry seems to me, although not a lumberman, to be too great to be overlooked. I have found an idea of how this work might be done for the lumber companies.

They might make arrangements with the Government to have their own limits photographed, merely paying rent for the machine while on their work, and the cost of the photographs, approximately \$4.00 per dozen. This would cut out the necessity for having machines, operators, and cameras of their own.

First of all, take the timbered area which carries a

variety of trees, it need only be a small area. Have it accurately cruised, or better still, have a survey made of this one small area and have species of trees given and also condition of ground as to rock, outcropping, etc. Then have this area photographed at two seasons of the year, preferably in the spring, before the leaves come out on the deciduous trees, and then again when they are in full leaf. These photographs will be taken from a known altitude in order to arrive at a scale. Have them carefully analyzed in every detail and records made. They could then be used as standards in analyzing photographs of any tract of timber land, and I am quite sure that an accurate estimate could be made of standing timber, burnt over areas, areas fit for forestation and reforestation and also the water in the vicinity. If photo-



AN INDICATION OF WHAT THE AEROPLANE CAMERA MIGHT DO IN MAPPING THE FORESTS OF CANADA

There is a lamentable lack of forest maps in the Dominion. Some aviators claim they can distinguish tree species by examining stereoscopic photographs and by other methods. This, of course, would be only of general value and the ground cruise would always be necessary. Note the remarkable boldness of outline at 15,000 feet. (A photograph taken on the French front.)



HOW WOODED AREAS ARE DEFINED BY CAMERA FROM 15,000 FEET IN THE AIR

The strips of white and grey in blocks represent cultivated land, the difference in shading being accounted for by various crops, hay, grain, stooked and uncut fields, meadow, etc.

graphs were taken with a stereoscopic camera they could be viewed through a stereoscope and undulations of the ground which would tell the direction of the flow of streams observed. I should imagine, however, that the map would be sufficient to show this.

If a stated altitude is maintained in taking all the photographs they will naturally be of the same scale and a continuous photographic map of any area can be obtained. Each company could have a natural photograph of its own limits hanging on the wall, could see exactly where logging is going on, and if they wish to do so, could keep track of the progress of the work.

I do not for a moment suggest that photography would be a means of dispensing with cruising in the woods, but I think that it would be of great assistance to cruisers and eventually they will all want to become enthusiastic interpreters of air photographs.—
(From the *Canadian Forestry Journal* of March, 1919.)

UNIVERSITY OF MINNESOTA OFFERS COURSE IN LUMBER USES

LUMBER dealers, manufacturers of timber products contractors and carpenters, who have need of specific instruction in the proper selection of the material used in their industry, will find in the course, "Lumber and Its Uses," offered by the General Extension Division of the University of Minnesota, just what they have been looking for. The course is based upon R. S. Kellogg's text by the same name, and uses as supplementary material a large number of valuable pamphlets issued by lumber associations on grades, sizes, characteristics, etc., of the various woods. It also furnishes a valuable bibliography on such subjects as preservation and seasoning, strength tests, grading and scaling, as well as in the general field.

The kind and grade of wood selected for any use should be the one best adapted to that use, all things considered. The timber dealer must know the qualities of the material he handles well enough to select the best for his own use or that of his customers. If a cheaper timber properly preserved can replace a more costly kind, he should know

it. Timber having been in use so long, it is falsely assumed that dealers know the material well. They do know it in a general way; but it is only in recent years that specific information regarding woods has been sought in laboratory and testing room and given to the public. The matters of wood structures, of tests of strength, durability, preservation and other questions are now being settled in a scientific manner. Results of such tests are included in the correspondence course given by the University of Minnesota.

Many persons are now interested in the use of wood in the manufacture of airplanes either as a matter of general interest or with the idea of becoming inspectors of these woods. It is, of course, impossible to train an inspector in such a short course as this; but much valuable information along this line can be obtained as a sound basis for future work. Only a true understanding of the qualities and peculiarities of wood structure can give an adequate idea of the difficulties encountered in this, or, indeed, in any form of wood manufacture.

**WE WANT TO RECORD YOUR MEMORIAL TREE PLANTING. PLEASE ADVISE
THE AMERICAN FORESTRY ASSOCIATION, WASHINGTON, D. C.**

THE USES OF WOOD

WOOD USED IN THE COOPERAGE INDUSTRY

BY HU MAXWELL

Editor's Note:—This is the thirteenth in a series of important and very valuable articles by Mr. Maxwell on wood and its uses. The series will thoroughly cover the various phases of the subject, from the beginnings in the forest through the processes of logging, limbering, transportation and milling, considering in detail the whole field of the utilization and manufacture of wood.

THE cooperage industry includes the manufacture of barrels, kegs, staves, heading, hoops, and other articles made of staves.

The growth or decline of this industry from year to year cannot be conveniently shown, because the government compiles statistics only every five or ten years, and

the cooperage associations have never brought figures together except in the most superficial way. It is known, however, that the cooperage industry is fairly stable and does not vary much from year to year. The greatest influence recently has been the prohibition movement which has threatened to lessen the demand for barrels for spirituous liquors. Such barrels constitute a rather small part of the cooperage industry as a whole, and the

diminution in the output of whiskey barrels will not greatly lessen the cooperage production in the country. Similar changes have taken place before in the cooperage business, as in the substitution of bags for barrels for cement, sugar, and flour; and pipelines and tankcars in place of barrels in the transportation of oil. In spite of such changes and fluctuations, the cooperage business has moved steadily on. What has been lost in one direction has been made up in another.

There are two kinds of cooperage, commonly distinguished as "tight" and "slack." Tight vessels are intended for liquids; slack for dry articles. Classes and grades come between the two extremes. The barrel that carries alcoholic liquors is considered the highest class of tight cooperage, while the vegetable barrel is typical of

slack containers. The slack barrel end of the business is the larger, judged by quantity of wood required in manufacturing the product; but tight barrels demand a much higher grade of wood. The value of the slack stock used in the country is nearly fifty per cent more than the value of the tight material. Nearly any wood is suitable for some kind of slack cooperage, but only a few are serviceable for tight.

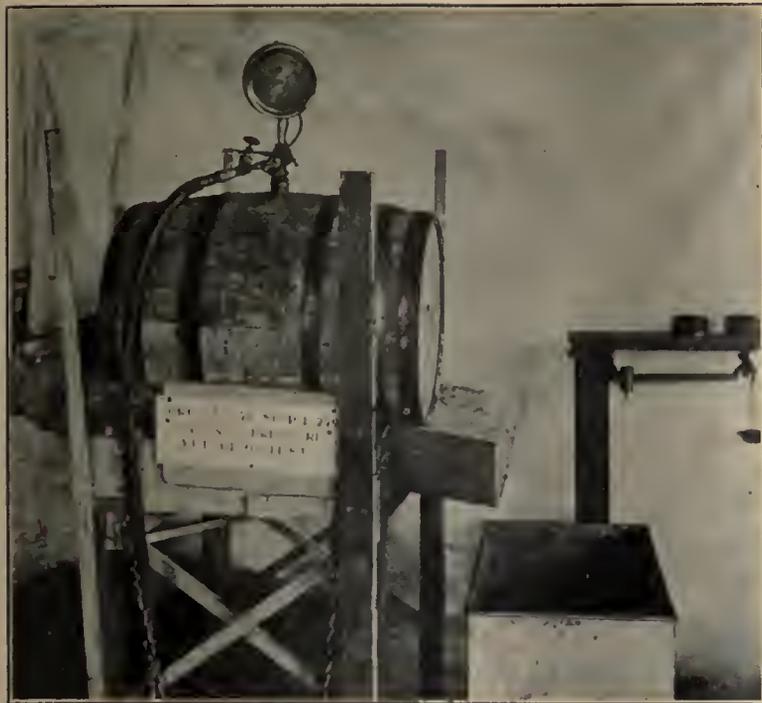
All cooperage whether tight or slack

is made up of three parts, the staves, the heading, and the hoops. No barrel is constructed without all three of these, though certain patterns of veneer drums combine the staves and the hoops in the wooden sheet that forms the body of the vessel. No well defined line of demarcation separates the barrel from the hamper or stave basket, and sometimes it is not easy to say which is which. The manufacturing of the three parts often constitutes three separate industries, a mill or factory confining itself to



A MODERN WINE CELLAR

This wine storage room is underground at the Cresta Blanca Winery, Livermore, California. A peculiar and very high-class of cooperage is used, the heads of the casks being oval instead of circular. The underground tunnel assures an even temperature and contributes to the perfection of the wine. Photograph by courtesy of the California Grape Protective Association, San Francisco.



A LABORATORY BARREL TEST

The pressure is applied within and the amount of it is recorded for future reference. When the force becomes too great for the strength of the wood, the staves are forced apart or they break, or the head gives way, or the hoops may break and the barrel go to smash, which of course puts an end to the test.

one of them alone. The three parts are often brought together by the user who assembles them as the barrels are needed; but not infrequently a single factory turns out finished barrels which are then distributed to the users. The woods for the three parts are not always interchangeable. Heading woods may not be satisfactory for staves; that for staves may be objectionable for heading; while hoop woods are not wanted for heading or staves. Steel is being substituted for wood in cooperage, there being steel barrels without a particle of wood; but the most common substitution is wire or strap metal for hoops.

In the year 1909 there were in the United States 1,506 establishments producing slack cooperage. They manufactured 2,029,548,000 staves, 140,234,000 sets of heading, and 375,793,000 hoops. Usually sixteen slack staves, two sets of heading, and from four to eight hoops make a barrel, but great variation occurs in different kinds of barrels and kegs. The values in the United States in 1900 were, staves, \$11,477,399; heading, \$6,138,881; hoops, \$2,578,845. The following list shows the woods from which the slack staves were made, and the number made from each:

Red gum, 416,570,000; pine, 306,621,000; beech, 268,237,000; elm, 245,172,000; maple, 133,255,000; chestnut, 93,290,000; birch, 78,897,000; basswood, 72,537,000; spruce, 72,219,000; ash, 71,705,000; oak, 66,675,000; cottonwood, 66,260,000; tamarack, 28,832,000; cypress, 25,673,000; tupelo, 22,500,000; sycamore, 17,831,000; hemlock, 10,376,000; cedar, 9,410,000; yel-

low poplar, 7,851,000; balsam, 6,037,000; Douglas fir, 5,165,000; willow, 3,287,000; all other, 1,128,000; total, 2,029,548,000.

Room exists for considerable choice of wood for staves in slack cooperage, but not so much for containers of liquids. Flour barrels were once made principally of cottonwood staves, but elm has proved to be a good substitute. A white wood that presents a clean appearance is wanted, and it must be tough enough and strong enough to carry the load. It must be free from odor or taste that might injure the contents. The sugar barrel demands material of the same kind.

Red gum leads all other woods because it is abundant and satisfactory. The shippers of butter, lard, meat, and other food products select the most suitable woods for their barrels. Custom has much to do with it, but not all; for it is easy to understand that a pine barrel might taint food with the taste of turpentine. The hardwoods are demanded in three times the number for slack barrels as are the softwoods; yet many commodities go to market in softwood barrels and kegs. Scrub pine is used for nail kegs and for containers of other small hardware. Timber which is fit for little else, and poles only a few

inches in diameter, are sawed into staves.

All of the stave woods listed above are likewise used for heading, except cypress; but pine heading is consumed in twice the amount of any other, and beech stands second, with red gum third. The heads of various sizes are cut with special machines. Slabs from sawmills, are cut in rather large quantities into heading, and by combining a slack cooperage operation with lumber pro-



HARD BUMPS IN PROSPECT

This test was made at Madison, Wisconsin, by the Government, the purpose being to determine how much tumbling and bumping a filled barrel will stand before it bursts. Barrels get such treatment as this while being loaded and unloaded in the process of transportation by wagons, boats, steam trains and other methods.

duction, better utilization of the wood is secured. The coopers use the waste from the sawmill. Short and defective logs can be worked into staves and heading. Michigan leads all other states in slack cooperage production.

In the production of hoops, Ohio leads all other states, and is followed in the order named by Indiana, Michigan, Missouri, and Arkansas. Woods suitable for hoops are not so numerous as those for staves and heading. Toughness and strength are essential in hoop woods, for the hoop must bend without breaking. Following is a list of hoop woods and the annual output of hoops from each in the United States:

Elm, 339,477,000; red gum, 9,877,000; pine, 8,321,000; birch 6,051,000; beech, 3,560,000; ash 2,020,000; oak 1,160,000; maple, 731,000; spruce, 106,000; basswood, 30,000; cedar, 5,000.

Though these figures were published under government authority, those purporting to give the production of pine hoops have been

questioned by manufacturers who do not believe that so many pine hoops are made. The unfitness of pine for hoops throws suspicion on the figures.

Two styles of wooden hoops are in use, the coiled and the straight. The coiled hoop is manufactured from logs,

the wood being elm almost exclusively; and the straight hoop may be so made, or it may be shaved from little saplings called hoop poles, each large enough for one or two hoops. If two hoops are made from the pole, it is first split down the center and a hoop is shaved from each half. The making of hoops from hoop poles was one of the earliest wood-using industries of America, and the

history of the business would read like a romance, though it deals with no very startling events. Some of the earliest hoops made in this country bound fish casks in New England, tar barrels in the Carolinas, and tobacco hogsheads in Virginia and Maryland. A number of woods were available for this commodity. In New England the long, pliant whips of white or old field birch (*Betula populifolia*) were the best, and most of them still wore the bark on one side when they went on the barrel or keg. Further south hickory held its ground as a hoop pole wood against all rivals; and very early in Virginia's history a writer sounded the



WHITE FIR KEG FOR SHIPPING GRAPES

This product, both container and contained, is of California origin. The packing for the grapes is redwood sawdust instead of cork dust which is used in Spain in packing grapes for export. Large numbers of fir kegs are required by the shippers of grapes from the Pacific Coast to the eastern states and to foreign countries. Photograph by courtesy of the California Barrel Company.

warning that so many choice young hickories were being made into hoops for tobacco hogsheads, that future hickory forests would suffer. Frequently thirty or forty hoops were used on one hogshead; not all at once, but it was the custom to cut off the hoops and expose the tobacco



CARVED HEAD OF AN OVAL CASK

California wine makers take much pride in their oval casks which are of large size and great strength. The carving on the one here shown is a work of art. It is in the cellar of the Beringer Brothers, St. Helena, California. It was on exhibition at the San Francisco world's fair. Photograph by H. F. Stoll, secretary of the California Grape Protective Association.

to view whenever a prospective buyer appeared, and afterwards replace the staves and put on new hoops.

The hoop pole business was once active in nearly all the eastern and middle western communities, and the name "Hooppole" is carried by more than one county to perpetuate the memory of an early flourishing business



A TYPICAL MOUNTAIN STAVE MILL

Small plants like the one here featured are located near the source of timber supply, and after working up what is in easy reach, move on to another location and there repeat the process. The bolts are usually split in the woods and hauled by teams, or on cheap tramways, to the mill that saws the staves. It is an Arkansas scene.

in this branch of cooperage. A number of woods, besides birch and hickory, are good for hoop poles.

Extensive use is made of barrels and kegs as shipping containers, and in some places they compete with boxes while in others they hold the field to themselves. The life of a barrel is put down at one year by the trade, but that is not enough. A majority of barrels are used many times. They begin as sugar or flour barrels, and are then sold to the farmer for shipping his produce to market. It

may be said that they are returned to him several times, carrying potatoes to the market on the first trip, and tobacco or lettuce on the next, each cargo being lighter in weight than the previous one, owing to the weakened condition of the barrel. Finally the barrel may serve out its life work as a trash receptacle, and in the end can be used for fuel. Thus it may be said that a barrel fills



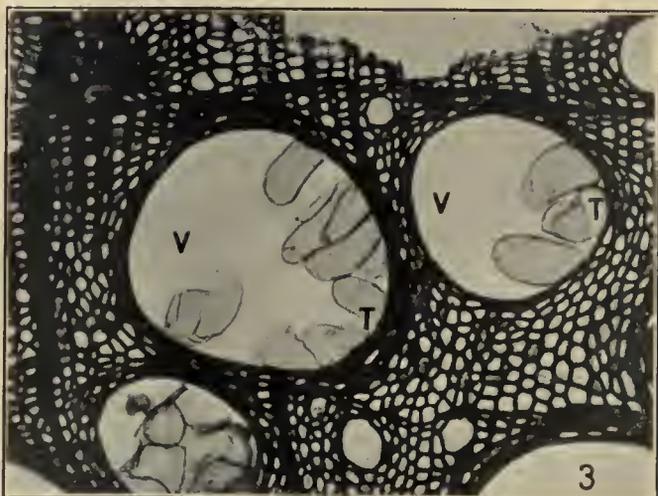
HOUSE MADE OF BARRELS

Empty barrels may serve purposes never meant by the makers. Above is a picture of a human abode constructed of barrels, near Evanston, Illinois. It was occupied by junk dealers as a home during several months, including winter weather when the thermometer fell to 19 below zero. Tared paper served as a roof and a stove furnished heat.

as useful a career as almost any other manufactured article, and its life is much longer than a season.

The demand for barrels is constantly growing, because modern machinery has made it possible to make them for the trade cheaper than almost any other form of durable package. That it is the most convenient form of package has long been acknowledged.

The heaviest demand comes from the cement business, and flour ranks next, closely followed by sugar and salt.



WHY BARRELS OF WHITE OAK DO NOT LEAK

Alcoholic liquors seep through the staves of most woods but not those of white oak, because its pores are plugged by a growth called tylosis. The above picture is from a highly magnified photograph of this growth in process of plugging white oak pores, preparing the wood for "tight cooperage." The illustration is by Miss Eloise Gerry in the Journal of Agricultural Research.

As containers for fence staples, bolts, nuts, nails, and packages for roasted coffee, spices, crockery, fruits, and vegetables, they follow in the order named. Glass manufacturers, baking powder companies, liquor distillers, and candy, tobacco, and cheese packers are big users of barrels. The demand for barrels for molasses, oil, lard, and pork, is also enormous, while dry paint, glue, snuff, oatmeal, screws, castings, and general hardware articles annually increase the demand on the cooperage supply.

Some woods are waterproof, others are not. Alcoholic

liquors and some oils will pass through the pores of some woods where water will not go. The wood of which a whiskey barrel is made may absorb a gallon of whiskey, without any passing through the staves and escaping. Some woods are so porous that barrels made of them will not hold water very long. Coopers learned by experience that certain kinds of wood made better staves than others, when the barrels were intended for liquid. It was wholly a matter of experience at first, but later the microscope helped to explain why some are proof against seepage

and others are not. All wood is more or less porous. It is made up of hollow cells, connected one with another by small openings, all microscopic in size; but some of the hardwoods have openings much larger than cells. They are tubes running through the wood, up and down the trunk of the tree, and are called pores or vessels. Some of them, as in oak and ash, are large enough to be seen by the unaided eye, by inspecting the end of a

freshly cut stick. These pores are responsible for the fact that some barrels will not hold liquid. It seeps into the pores and flows along them until it passes entirely through the staves and escapes. That is why wood with large open pores is not suitable for tight barrels.

White oak has always been considered the best tight cooperage wood. Many years ago it was thought that no other could or should be used for certain liquid commodities, but others have lately come into use. Yet, white

oak has large pores, and a casual observer noting that characteristic would conclude that it is not good for tight barrels, but experience shows it to be good. Though it has large pores which may be easily seen, they are not open. They are closed as a bottle is closed with a cork, and liquid cannot enter. The plugging substance, which is known as tylosis, is of a whitish color and is deposited in the pores by the wood itself, in the progress of the tree's growth and maturity. It occurs principally after the sapwood has changed into heartwood. Red oak's pores are not plugged.

Therefore, red

oak is not suitable for the best kinds of tight cooperage.

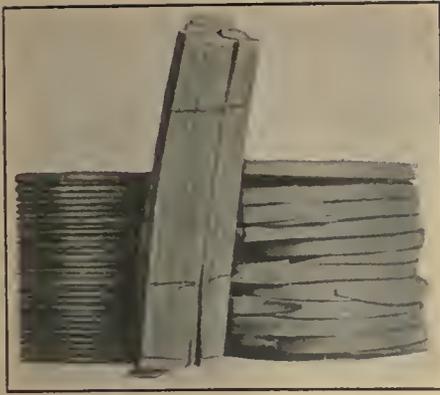
The condition of the pores, whether they are plugged or not, explains why fewer woods are available for tight than for slack cooperage. The following table gives the kinds and the number of tight staves made from each of several woods annually in this country:

White oak, 217,019,000; red oak, 30,619,000; basswood, 30,589,000; gum, 23,566,000; pine, 20,648,000; ash, 5,568,-



GAUGING PRESSURE ON THE BARREL'S SIDE

When barrels are carried in the holds of ships and in barges they are often piled one upon another ten feet high or more. Not infrequently the superincumbent weight breaks the barrels in the lower tier. This test was made to obtain an idea what barrels lying on their sides will bear.

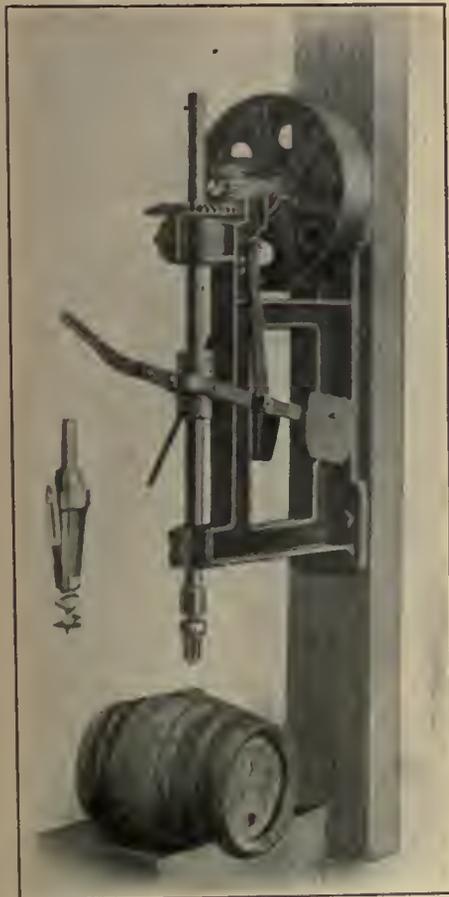


SHOOKS READY FOR SHIPMENT

A barrel consists of three parts, the staves, the heading and the hoops. That is true for all wooden barrels whether they are for dry commodities or for liquids. The bundled material sufficient for one barrel is called a shook. It is much cheaper to ship a shook than the barrel after it has been set up and completed as a barrel.

000; all other, 13,250,000; total, 341,250,000.

Only the best wood is used as barrels for alcoholic liquors; but some other woods will do for other kinds



A BUNG BORING MACHINE

Coopers have machines for nearly everything they do. The boring of bungs is shown in the above picture. The machine is designed to "bore and bush" in the same operation. The boring is a particular piece of work and if it is not done exactly right there will be trouble with leaks later when the barrels are filled with beer. Hand boring is apt to be defective.

of liquors, such as brine for pork, vinegar for pickles, and for certain oils.

Tight barrels are of several sizes. The strongest, heaviest staves are for beer barrels and kegs. The staves are manufactured by several different processes and are named accordingly, as sawed, hewed, and bucked and split. The tight cooperage industry is well distributed over the country but is more important in some sections than in others, depending largely upon the available supply of suitable timber in the various parts of the country. The leading states in annual production of tight staves are here given:

Arkansas, 87,582,000; Kentucky, 45,694,000; West Virginia, 40,402,000; Mississippi, 39,052,000; Tennessee, 35,744,000; Ohio, 26,534,000; Missouri, 22,420,000.

The waste of wood in the manufacture of tight staves in the past has been very great, but it is not now so great as formerly, because utilization is closer, and material which would have been thrown away formerly is now converted into other products. Much of the finest oak of the country was cut for staves in past years. The makers of this commodity went ahead of lumbermen in new territory, and being first in the oak region, they naturally selected the best oak trees, took the choicest portions of the trunks, and rejected the rest. They made no attempt to use wood which did not split well, and the stave maker's verdict: "It won't rive," was final and consigned the tree to the waste heap. It meant the abandonment of an oak trunk which might contain 3,000 or even 5,000 feet of lumber. That does not often occur now, for a sawmill is usually within reach and what cannot be split for staves can be sawed for lumber, or the logs may be sent to a mill equipped to saw staves or heading.

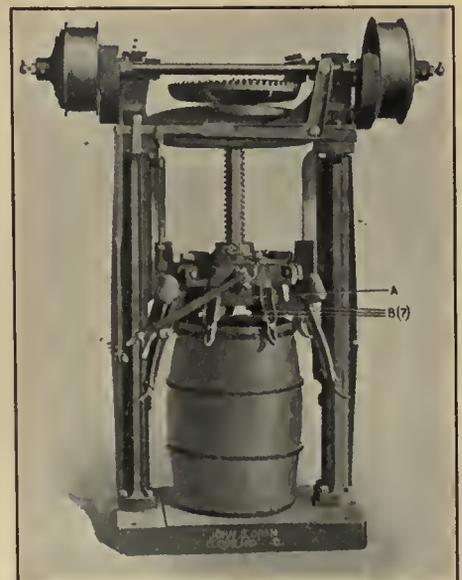
It was once a common situation in forests where stave makers were operating for the ground to be covered with refuse billets and bolts which were left to rot because they



EXAMPLE OF TIGHT COOPERAGE

The barrel here shown illustrates the class of cooperage known as tight. The barrels are intended to hold liquids. Not only must the joints be leak-proof, but the wood must not permit seepage through the pores. This barrel is of white oak, which is the highest grade of wood for tight cooperage.

were not just what the operator wanted. The workmen had no compunction when they left on the ground enough oak to make a thousand staves. Good trees were plentiful, and the stave makers turned their backs upon heaps of slightly defective bolts and went to work with their axes to fell other



A BARREL TRUSSER AT WORK

Machines have been devised and perfected for doing most parts of barrel making. The hand workman formerly did it all, from felling the tree to finishing the barrel, but appliances have been invented which need only to be set in motion and directed by the brain of man, and they will do the rest.



FIFTY-THOUSAND GALLON REDWOOD TANKS

Cooperage of unusual size is here shown. These receptacles are part of the plant of the Hercules Powder Company at San Diego, California. Redwood was employed because of its well known resistance to decay, and the closeness with which its joints may be fitted. The photograph was supplied for this illustration by the California Redwood Association.



BARRELS WHICH HAVE SEEN BETTER DAYS AND BETTER DUTY

The description of this picture should not be made too explicit nor the exact locality be pointed out, for the moonshiner must not be disturbed during business hours. The name of the photographer is unknown, but the camera told an interesting story. It needs no embellishment.



SETTING UP THE SLACK BARREL

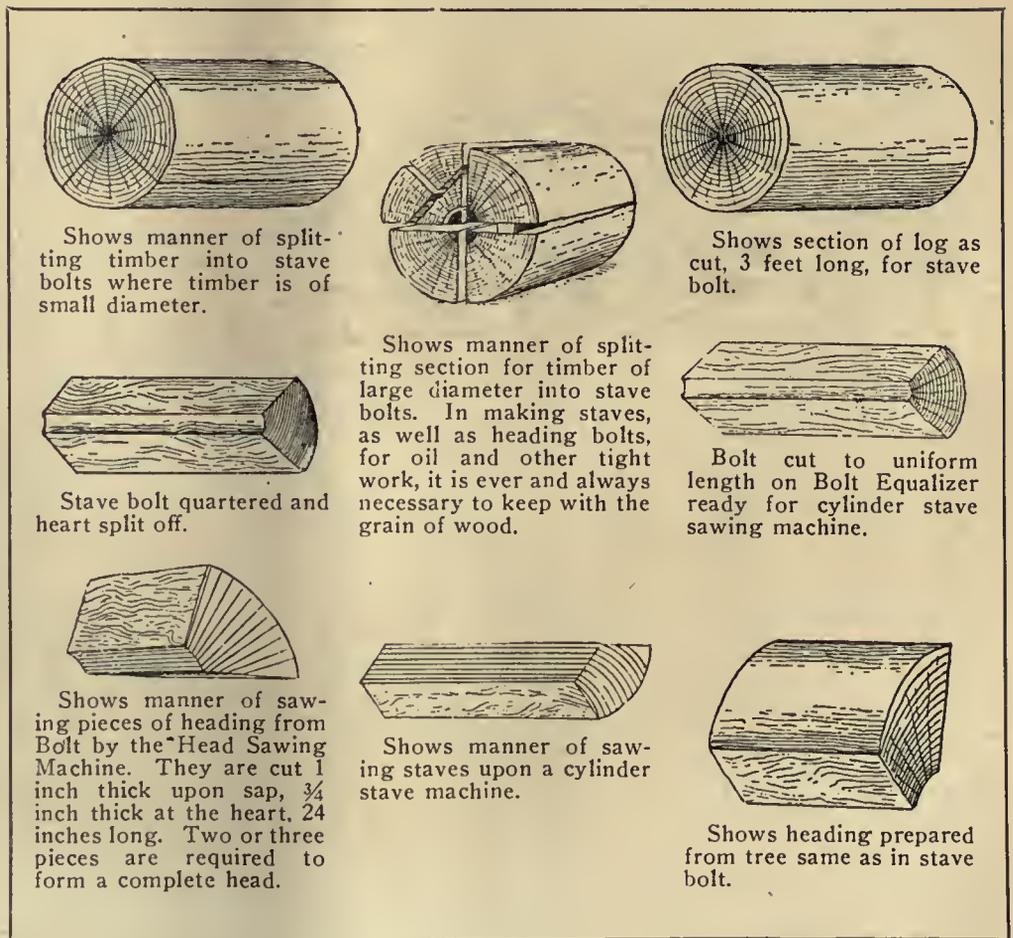
Shooks are often made near the source of the timber, but the barrel is frequently put together and completed near the place where it is to be used. Skilled hands can do the work very rapidly. The illustration shows apple barrels and is from the catalogue of J. D. Hollingshead, Louisville, Kentucky.

he could do all the work without going outside of his own family for assistance. Some stave making is still done along similar lines, but not much. Oak stumpage now has value, and it is pretty hard to carry on the smallest operation without the investment of some cash capital. Less dependence is placed on hand labor than formerly and more in machinery; and machines are expensive.

Bungs and faucets are listed as cooperage though they are sometimes considered as belonging to the subdivision of woodenware which is regarded as a separate industry. The bung closes the opening in the barrel; a spile or spiler is a small plug for closing a vent in a barrel or cask; while a faucet or spigot is a contrivance for drawing

trees. Even when the operator had no fault to find with his timber, he usually left twice as much on the ground as waste as he took away as staves. Families living near the stave operations in the forests often secure sufficient waste oak to provide household fuel for years; and most of it was of such high grade stuff that it would have passed inspection by any furniture factory, had it been sawed into lumber instead of being split and slaughtered in the process of stave making.

Staves were saleable at good prices at a time and in regions where no market for lumber existed, and for that reason the stave operator was in advance of the lumberman in new country. Little capital was required in making staves when the farmer owned plenty of good oak timber, could buy a crosscut saw for eight dollars, an ax for a dollar, iron wedges for a dollar, a froe for the same, and could make his own maul, mallet, and wooden gluts; and the fork of a log served him for a riving horse. Thus equipped, he was ready for business. He had few labor bills to pay, for



Shows manner of splitting timber into stave bolts where timber is of small diameter.

Shows section of log as cut, 3 feet long, for stave bolt.

Stave bolt quartered and heart split off.

Shows manner of splitting section for timber of large diameter into stave bolts. In making staves, as well as heading bolts, for oil and other tight work, it is ever and always necessary to keep with the grain of wood.

Bolt cut to uniform length on Bolt Equalizer ready for cylinder stave sawing machine.

Shows manner of sawing pieces of heading from Bolt by the Head Sawing Machine. They are cut 1 inch thick upon sap, 3/4 inch thick at the heart, 24 inches long. Two or three pieces are required to form a complete head.

Shows manner of sawing staves upon a cylinder stave machine.

Shows heading prepared from tree same as in stave bolt.

THE PROCESS OF SPLITTING STAVES

Art, science and experience are necessary in the production of the best split staves. More skill is required to make them with maul, mallet and froe, than with saws. The accompanying series of diagrams is from the catalogue of the Oram Barrel Machinery Company, Cleveland, Ohio.



THE CHINE TEST FOR BARRELS

The load is not applied squarely on the head or squarely on the side, but on the barrel's chine. Hoops and staves are alike subjected to the strain. This barrel stood about 17,500 pounds. The test was made at the government laboratory at Madison, Wisconsin, and was one of a series on tight barrels.

liquids from a barrel. The manufacture of these small wooden articles requires more than 21,000,000 feet of lumber a year, ninety per cent of which is yellow poplar which is the best bung wood known. It contains no hard and soft streaks, therefore, it may be cut with a smooth surface which insures a close fit without leakage. The wood is dense enough to prevent liquids from seeping through, but it imbibes sufficient moisture to swell the wood, insuring a still closer fit. Walnut and red gum have been used to a limited extent for bungs and are quite satisfactory. Bungs are cut by

machinery from lumber an inch or more in thickness. A larger quantity is made in Cincinnati, Ohio, than in all the rest of the United States combined.

The faucet is seldom sold along with the barrel but is a separate article. It is made in many patterns and of many woods, among them being white pine, spruce, maple, birch, beech, red gum, redwood, chestnut, cedar, walnut, and rosewood. A superstition formerly was to be met with that the wood of which a spigot was made exercised an influence upon the liquid which flowed through it; and for that reason molasses should be drawn through a maple spigot only, beer through one of birch, and cider through one of applewood. The applewood spigot was strongly insisted upon for cider, and it has been currently believed that much applewood is still consumed in the manufacture of faucets for cider barrels. The superstition must have lost its power if it ever had any, for an examination of statistical reports of wood-working does not show the use of a single foot of applewood for faucets in the United States. Sailors along the Atlantic coast in early years insisted upon equipping their water casks with white cedar faucets because of the reputed esoteric purifying qualities of the wood. Fishermen from New England and Canada, who drank spruce beer while on the New Foundland Banks, saw to it that their beer was drawn through no spigot but one made of spruce wood.

Many small articles made of staves are commonly classed as woodenware rather than as cooperage, among such being pails, buckets, keelers, measures, tubs, tool-dishes, and piggins. These have bottoms but no heads. The exact definition is not very important, for cooperage is a term broad enough to include all of them. The making of cedar pails was once a very important occupation in and about Philadelphia, the materials being both the white and the red cedars of that region, and the makers were known as "the cedar coopers."



KEG STAVES OF CHESTNUT WOOD

This photograph represents a scene in Maryland, and is published by the courtesy of F. W. Besley, state forester. The danger that chestnut forests would be speedily destroyed by blight induced many owners of such forests to work their timber into merchantable commodities as speedily as possible. Chestnut makes excellent small staves.

TUSSOCK MOTH CATERPILLAR CAMPAIGN

BY M. M. BURRIS, CITY FORESTER

DURING the past few years the tussock moth caterpillar has been doing very much damage to the shade trees of Trenton. Conditions were becoming unbearable. There were not sufficient funds to do any spraying on the street trees and so this pest continued its ravages unrelentlessly.

There was but one thing to do—to collect and destroy the egg-masses on the cocoons. We followed the same procedure as in our bird house building contest and enlisted the services of the school children in a campaign

to pick egg-masses, with the hearty co-operation of the Commissioner of Parks Burk, and Miss Ruth Scott, Director of Na-

and habits of this pest, the damage done by it and the methods of eradicating it. The children were all interested, and promised to do their bit. The moving picture houses were of great assistance to the cause by showing caterpillar slides, which were prepared by us.

Through experience in the past, we discovered that prizes form a great incentive to children, and to prove to the children that the citizens of Trenton were actively interested in this campaign, it was decided to have some of the merchants offer prizes. The moving picture houses were first to offer prizes. Eight theatres offered three prizes each; first prize, free admission for a three months' period;



THE VICTOR AND SOME OF THE SPOILS

Emil Jantz, a pupil of the McClellan School, who ranked highest in the number of individual cocoons collected.



HARD AT WORK

Pupils of the Harrison School busily engaged collecting the cocoons. Paper bags were often used as containers.



ROOSTING HIGH

These are some of the boys who worked so enthusiastically and successfully in Trenton's tussock moth caterpillar campaign.

ture Study in the Public Schools.

A meeting was called for January 28, which was attended by every principal and teacher interested in the preservation of our trees. Commissioner Burk and I explained the purpose of the meeting and spoke of the destructive work of the tussock moth caterpillar. Enthusiasm prevailed and the teachers and principals pledged their support to this campaign, which was decided upon to start on February 10.

We visited the various schools and spoke to the children on the tussock moth caterpillar. An excellent set of lantern slides was procured showing the life

second prize, free admission for a period of two months, and third prize, free admission for a period of one month. In a short time we received 50 offers of prizes, ranging from a ton of coal to a pair of roller skates. Commissioner Burk also

offered bronze and silver buttons to the boys and girls picking upwards of 500 cocoons.

The campaign started on February 10 and ended on May 1. During this period of less than three months, the total number of cocoons collected amounted to 2,961,932. The number of children having picked more than 500 cocoons was 421. Emil Jantz, led with 243,529;

Aoner Robinson collected 235,464; Benjamin Palby, 213,550; George Nelson, 190,315; Elmer Manesevitz, 158,500; Joseph Boduar, 126,392; Alex Elias, 106,347.

These figures talk for themselves. The campaign was truly a successful one. The children are interested, and are becoming more and more enthusiastic about trees.

Surely, these youngsters, in years to come, will be educated to the beauty and value of shade trees, and will see to it that the shade trees of this city are not neglected. The *Trenton Times* gave lots of publicity to the campaign and contributed in this way very substantially to its success.

FOREST INVESTIGATION

FOR some time there has been a growing conviction on the part of foresters in the United States that the amount of silvical research conducted by all agencies, including the Federal Government, is very inadequate. The war has emphasized this more than ever.

The southern pine region is still our largest center of lumber production, and the naval stores industry, even though it has materially declined in the last 20 years, is still the world's largest center of naval stores production. The growing area of cut-over land in the South which is not being utilized for agriculture and on which forest production, if there is any, is largely an accident, calls among other things for a much greater effort in forest research than has ever before been possible. Aside from the small amount of work which has been done by the Forest Service on the Florida National Forest and in co-operation with one agricultural station and in general studies, practically nothing has been done. Of fundamental forest research in the southern pineries there has been little or none. The South can be continued as one of our most important timber producing regions, but one basis for this must be a better knowledge of how to practice forestry.

Hardwood production in the United States is centered very largely in the Appalachians and neighboring States. This field has been covered during the past 25 years by a series of investigations which have helped to answer immediate questions, but fundamental problems at the basis of the practice of forestry have hardly been touched. A very large acreage in this region, because of topography and soil, is most suitable for timber production including the woodlot, as well as the larger areas in which can be grown timber for the general market. Practically unlimited markets are immediately at hand and close utilization is possible. The number of species is very large and practically all of them have well-established usages. In this diversified forest many problems of silviculture require solution and some provision should be made for attacking them on an adequate scale.

Similarly in the Lake States comparatively little has been done to lay the foundations for the practice of forestry on the large areas of potential timberland which are now so largely waste. Continued timber production of both softwoods and hardwoods is possible on a large scale, but on the basis of present attempts at forest research the foundation for proper silvicultural methods can not be laid for many years to come.

In New England there is a limited amount of forest research under way by a considerable number of agencies,

no one of which is covering the field adequately. The Federal Government is doing practically nothing. It is probable that a reasonable effort by the Federal Government in this region would serve to round out and stimulate and unify the activities of other agencies so that the forestry problems of the New England States could be solved within a reasonable time. In this region, as we all know, the evolution of lumbering and the gradual drift towards forestry has gone further than anywhere else. We now have probably a better opportunity for the practice of forestry on private lands than in any other part of the United States, barring mandatory provisions.

Even in the West, to which the research activities of the Forest Service have had to be mainly directed during the last 10 or 15 years because of the necessity of information on which to base silvicultural practice in the National Forests, the extent of the work has been far from satisfactory. Within the last five years in order to put the work on a satisfactory basis at fewer places it has been necessary to reduce the work in California very materially, this in spite of the importance of the problems which are pressing for immediate solution. The work in California should again be taken up and in other parts of the West it should be materially enlarged.

There are also other lines of forest investigation which relate equally to all regions, as for example, forest mathematics, a subject which received more or less attention in the Forest Service some years ago but which it has been impossible to cover in any satisfactory way during the last four or five years. Here we have such problems as forest growth and yield, volume tables, scaling problems, and mathematical relationships between height, the diameter, volume, and form of trees, a large and important field on which the efforts of a number of men could be devoted for a number of years with results of the greatest importance to foresters and to the forest industries. There is another group of problems which could well be centered at a forest research laboratory, such as fundamental seed studies and forest biological studies in general.

The time has now come for much closer co-operation in forest research between the Federal Government, the States, the forest schools of high standing, and the State Experiment Stations, with the latter particularly on woodlot problems. Much more can be accomplished by some attempt at unification of effort of reasonable Federal assistance to the States or forest schools on lines of work mutually agreed upon, either in the loan of men or the allotment of funds, or in such other form as may

seem most advisable. Such co-operation should, therefore, be recognized as an essential part of the general program of enlarged forest research in the United States.

It should be recognized that the success of the efforts to secure adequate recognition for this work must depend in a very material degree upon the demand for the work outside of the Federal Forest Service. The present Federal appropriations for silvical research as approved by the House at the short session of Congress is about \$78,000. The Senate Committee added \$25,000 to this amount. It is believed that the general program above outlined could be carried out by an increase of this appropriation to \$200,000, and at the next session of Congress an effort will be made to have this amount appropriated for the work.

PAID IN FULL

THE following is a brief sketch of Captain Homer Smith Youngs, forestry official and university professor, who gave his life as the salient of St. Mihiel was wrested from the grasp of the Hun: Born in Stillman Valley, Illinois, September 26, 1892. Graduated from Belvidere, Illinois, High School. Enrolled in the University of Idaho School of Forestry, September, 1910, where he won highest honors both as a student and a marksman, and specialized in Forest Engineering and in Grazing. Accepting a position with the Forest Service, District 4, as Chief of Party in charge of primary triangulation, he prepared the base maps for grazing reconnaissance on which he was later engaged for some time. Early in 1916 he was appointed Grazing Examiner for District 1, with headquarters at Missoula, resigning in September of that year to accept a teaching position in forestry at his Alma Mater.

On January 5, 1917, he was married to Anne Geraldine Parker, of Los Angeles, and in the same month he passed the examination for second lieutenant, receiving his Commission April 1. On May 15 he was ordered to the Presidio at San Francisco and was commissioned first lieutenant on June 5. On August 29 he sailed from Hoboken to join the 16th Infantry, which had crossed with General Pershing in July, and first saw active service at the front in November, 1917, where he distinguished himself as a sniper because of his unusually accurate long-range marksmanship. In December he was sent to a British Army Scouting School for further training in methods of scouting and sniping, this training being further supplemented by observation and patrolling in the British trenches at the front. He received his captaincy on January 1, 1918, and on returning to his regiment was made regimental intelligence officer, in which position, he had charge of most of the patrols that went out from his Division—the famous First Division of the First Army. At Picardy he was seriously gassed and in the hospital for six weeks but again joined his regiment on the Champagne front where a shell, which ex-

ploded in a dugout containing three officers, killed the other two and left Captain Youngs unconscious and seriously injured from shell-shock. After two months in Base Hospital No. 8 he again joined his regiment on September 1, and on September 30, in the great battle of St. Mihiel, he went over the top for the last time fighting in the Argonne Forest until October 4, when he received a severe wound in his right shoulder severing nerves which necessitated the amputation of his right arm on October 30. He was never able to bear the strain of



A FOREST HERO OF THE WAR
Capt. Homer Smith Youngs, Co. E, 16th U. S. Infantry.

moving to a base hospital and on November 23 blood-transfusion was resorted to but he died on the morning of November 24, 1918. He now sleeps in Brizeaux Village, just south of the Argonne Forest.

He leaves a young son, Homer Smith Youngs, Jr., whom he had never seen.

Without ostentation, but with dispatch and thoroughness, fearlessly and dauntlessly, his work was done. Those who knew him best loved and trusted him most. He died in the service of his country which he loved so well, and of whose splendid young manhood he was such a perfect type in every sense. His life; his example; his supreme sacrifice, should not be permitted

to fade from the memory of American foresters and all those who enjoy the blessings of liberty and justice vouchsafed by such as he.

His friend and teacher,

C. H. SHATTUCK,

A GARDEN OF THE BRAVE

By Vilda Sauvage Owens, in The New York Times

I sometimes dream that in the years to be,
When France shall rise once more, resplendent, free,
One lovely corner there shall be a grave—
A Garden of the Brave.

And in my dream I see a quiet nook,
That nestles by a silver, running brook.
Brave Belgians sleep within this lovely spot,
'Neath blue forget-me-not.

And close beside, where all is rest and peace,
Acre on acre of the fleur de lis.
Here where the very angels watch are keeping,
The sons of France lie sleeping.

Great masses of the wondrous wattle here,
Where stanch Australians rest. And very near,
A mighty avenue of maple trees,
All gold and crimson, fling with every breeze
A cloud of little winged seeds, that fly
Where brave Canadians lie.

Beneath a coverlet of shamrock rest
Old Ireland's sons, her bravest and her best.
And hark! The music of the pipes! They play
Always where buried Scotchmen sleep, they say.
And purple thistles whisper in the dells
To bonnie heather bells.

Old England's roses here, the white and red,
Where sleep in countless graves her gallant dead.
Here, too, the tiny English daises grow.
The soldiers loved them so!

And further still, a little nook, yet dear,
The friendly sunbeams love to linger here,
Where glowing California poppies nod,
And yellow goldenrod.

I dream that as the years move on apace,
We'll fare as Pilgrims to this hallowed place,
And pause beside each fragrant, flowering glade,
Or rest beneath the leafy maples' shade,
And hold communion there in love divine,
And pray, as at a shrine!

FOREST RESERVE FOR KENTUCKY

THROUGH the gift of the Kentenia-Catron Corporation, which owns thousands of acres in Eastern Kentucky, the State has acquired a forest reserve of 3,400 acres on Pine Mountain, Harlan County. The land is not underlaid with coal and has no agricultural value. It is the first reserve the State has acquired and J. E. Barton, commissioner of forestry and geology, who has been trying for several years to secure such a tract, said that it will afford an excellent opportunity to demonstrate reforestation and the proper method of propagating trees and lumbering.

PLANT MEMORIAL TREES

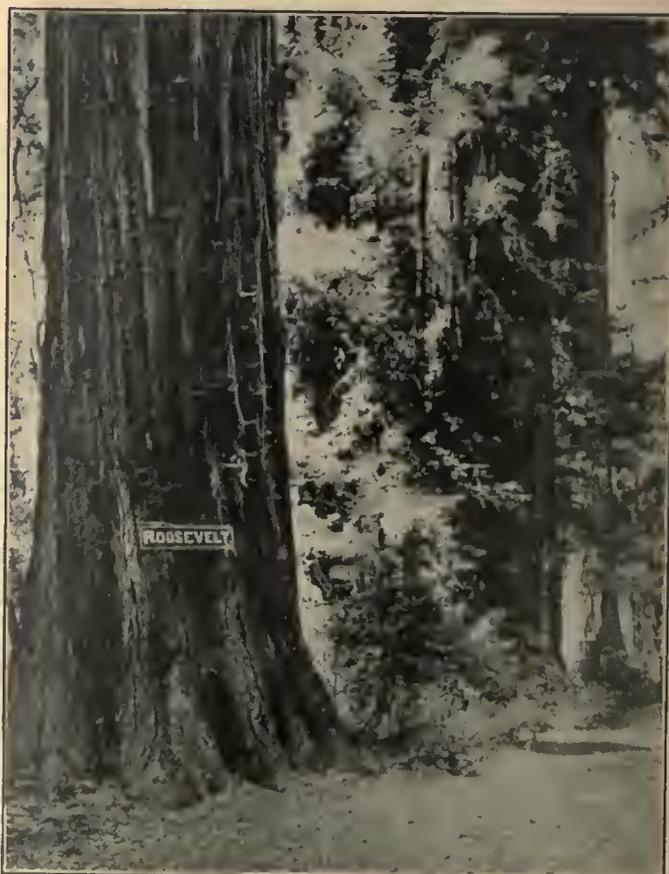
MORE AIRPLANE PATROLS FOR NATIONAL FORESTS

TWO additional routes in the patrol of national forests by Army airplanes, to give early warnings of fires in the forests, have been arranged by the War Department and the Forest Service, United States Department of Agriculture. The routes will be operated from Mather Field, near Sacramento, and were placed in operation June 1, on the same day as two routes operated from March Field, near Riverside, California.

The first route from Mather Field covers the Northern Eldorado and Tahoe Forests on the valley side of the Sierras. It starts from Mather Field and proceeds to Placerville, Colfax, Nevada City, Strawberry Valley and Oroville, where the planes land at available fields. This route is to be covered in the morning of each day and the return trip made in the afternoon.

The second route from Mather Field covers the Southern Eldorado and Stanislaus Forests. Starting from Mather Field, the route goes to Placerville, Grizzly Flat, Big Trees and to a landing near Sonora or Tuolumne. This route is covered in the morning and return trips made in the afternoon. Both of the Mather Field routes have a round-trip length of about 150 miles.

Forest Service reports tell of a successful trial patrol undertaken recently. No difficulty was experienced in detecting fires in heavy timber at elevations of 6000 to 10,000 feet.



THE ROOSEVELT REDWOOD—FITTING TRIBUTE TO OUR LATE EX-PRESIDENT

A monument that has stood for ages and will stand for ages to come is the giant redwood tree in the Yosemite Valley which bears the name of Roosevelt. A more fitting tribute in memory of our late ex-president can hardly be imagined.

INSECTS IN THEIR RELATION TO FORESTRY

BY DR. R. W. SHUFELDT, F. A. O. U., ETC.,

MEMBER BELGIAN ORDER OF ST. JOHN OF JERUSALEM

(PHOTOGRAPHS BY THE AUTHOR)

FOR the past half century and more, the immense host of insects that are, to a greater or less degree, inimical to our forest, fruit, and shade trees, have been under investigation by entomologists in both public and private life. The indefatigable workers in the various Federal departments at Washington and elsewhere have contributed an enormous literature to this subject, covering every line of research embodied in the science; while the results they have achieved have been of the most incalculable value, not only to the country at large, but to those interested in trees of all kinds anywhere. This is true irrespective as to whether the latter be represented by our most extensive private or governmental forest owners, or by one having but a few trees under his care in any part of the United States, or in neighboring countries, whereon such insects occur.

As stated above, a large part of this literature, referring to the various forest-insect problems, has been published by the Government, and particularly by the Bureau of Entomology of the United States Department of Agriculture, of which Dr. L. O. Howard is the Chief. While a fairly generous supply of these bulletins and other publications are issued, they by no means reach all they should, nor supply the demand for them by those interested in the subject at large. This being the case, any extension of the knowledge of such matters, in any of its departments, should be regarded with favor; and to this end popularization of various phases of the science will, from time to time, be the object of this section of AMERICAN FORESTRY. In this work the bulletins issued by the

Forest Insect Investigations of the Bureau of Entomology, of which Dr. A. D. Hopkins is in charge, have been especially helpful, while in addition to such aid a great many actual observations, extending over many years, have been made by the present contributor in the

fields and forests. The observed phenomena thus studied will all be incorporated as the material is worked up and illustrated. Almost without exception the photographs of the matter described have been made from such material; and where certain insects have not been easily obtainable, they have been generously loaned the writer from the duplicate series in the United States National Museum collections. For such courtesies thanks are especially due to Drs. E. A. Schwarz and Harrison Dyar; to Messrs. Carl Heinrich, J. C. Crawford, H. S. Barber, and to others associated with them in the Bureau.

From the various sources of information brought down to us from the earliest time to the present day, certain primary facts have been established. In the first place, the list of insect forms that attack *forest trees* in this country is not an especially long one, when we come to consider the enormous array of species that are entirely innocent with respect to any such charge. Many insects

attack trees that have no claim to be classed as forest trees; while a formidable list of insects commit their depredations upon certain shrubs and plants, and never have anything whatever to do with trees. There are insects that feed only upon the *leaves* of forest and shade trees, causing damage to that extent alone; some of the bark beetles devote their attention to fully grown and



Fig. 1. THE LARVA OR CATERPILLAR OF THE REGAL MOTH (*Citheronia regalis*); NATURAL SIZE, FROM LIFE

This elegant larva of the Regal or Royal Walnut Moth is of an intense green color, with black and white markings. Its curious pairs of "horns" are brilliant scarlet, tipped with black. It is seen here feeding on the leaves of the sycamore tree.

sound trees, while other species do so wholly to dead or dying ones, or to fallen trunks of them in the forests and elsewhere. Then the roots of forest trees also have their special enemies, while others destroy the bark.

In so far as forest trees are concerned, perhaps the most destructive insects are the bark beetles, of which there are quite a large number of species. These beetles have, in times past, utterly destroyed forest trees covering hundreds of square miles, and they are committing the same depredations at the present time. They bore through the bark of pine, spruce, hickory, fir, and other trees—full-grown, healthy trees—and subsequently completely girdle their main trunks, which ultimately kills the tree so preyed upon.

In passing through the vast pine forests of the Southern States, as the writer has frequently done, one may plainly see the fearful devastation wrought by the various invasions of the common pine beetle of the South. Hundreds of square miles of dead pine and spruce trees may be seen in various stages of decay, the death having been caused by this pest. We may even observe the same class of destruction in its various stages in certain areas within the District of Columbia. Great quantities of useful timber have thus been lost to the country and the industries; while we may note similar destructive work in progress, and at all stages, due to the operations of the spruce beetle in the forests of those trees in northeastern United States and southeastern Canada.

"This species," says Doctor Hopkins, "caused the death of a very large percentage of the mature spruce over an area of thousands of square miles. In the aggregate many billions of feet of the best timber were destroyed. The large areas of this dead timber furnished fuel for devastating forest fires, with the result that in most cases there was a total loss."

More particulars on this vitally important subject will be brought out in future issues of AMERICAN FORESTRY, as well as observations on the destruction now in progress in our North American forests due to the attacks of other species of insects and their larvæ in still other regions.

Passing from these few introductory remarks on forest beetles to moths, we enter upon one of the most

attractive fields of inquiry and observation in the entire realm of biology. As in the case of all the biological sciences, it has its large literature, illustrated by thousands upon thousands of plain and exquisitely colored figures; while upon the other hand there is the entire world of nature ever standing open to the investigator for the verification of all that is set forth in that literature, and offering at the same time no end of new material for study and description. All this is equally true of the butterflies—a group so closely allied to the moths that they appear to almost run into each other. Now, in a great many instances, the larvæ of caterpillars

of both moths and butterflies feed upon the leaves of trees of many descriptions, those of our forests as well as the shade trees of our towns and cities. These insects may be studied with a great many objects in view; but this field is so extensive that to enter upon it in any satisfactory manner would result in the presentation of material far exceeding the limitations of the space at our command in the present connection. However, such information will be forthcoming from time to time, while right here it is proposed to briefly introduce one of the very handsomest moths in our insect fauna. This is the Regal or Royal Walnut moth, *Citheronia regalis* of Fabricius (Figs. 2 and 3). Its caterpillar is a most remarkable looking creature, and it is here shown life-size in Figure 1. A summer or two ago, Mrs. Bert



Fig. 4. ONE OF THE OLDEST BLACK WALNUT TREES IN THE ENVIRONS OF WASHINGTON, AND ONE THAT HAS PROBABLY SEEN FIFTY SUMMERS COME AND GO

Trees succumb from all sorts of causes. Old age has overtaken this one; but it has also been struck by lightning; partly strangled by vines; furnished food for thousands of larvæ, and weathered the gales of half a century.

S. Elliott, of Washington, D. C., was good enough to furnish me with more than a dozen living specimens of this grand larva of our Regal moth, they being transported on a big limb of a sycamore tree, bearing a great quantity of fresh leaves, which latter constitutes one of their foods in nature. In a reproduced photograph, this caterpillar is a rather tame-looking affair as compared with the living animal. To appreciate this, one must indeed see it in life, with its shiny, pea-green body, ornamented on the sides by an interrupted series of black and white markings; its red head and tail-plates; red and black feet, and its remarkable, double pair of curved, red and black horns on the segments just back of the head. Smaller horns, too, are seen elsewhere on the body, as shown in the cut. Country boys call this caterpillar

the "Hickory Horn-devil," and generally destroy it upon discovery. It has an average length of some five and a half inches, and is the largest caterpillar in our insect fauna. It does not spin a cocoon, as many other large caterpillars do; on the other hand, sometime in September, it works its way under ground, there to be



Fig. 2. MALE REGAL MOTH, VIEWED FROM ABOVE. SPECIMEN IN THE COLLECTION OF THE UNITED STATES NATIONAL MUSEUM. THE DARK BROWN PUPA IS SHOWN TO THE LEFT. BOTH REDUCED ABOUT ONE-THIRD.

Here is an instance in the insect world where the male of the species is conspicuously smaller than its mate (see Fig. 3).

transformed into the pupa here shown in Figure 2, from which it emerges during the following July as an elegant orange-red moth, with the dainty white and yellow markings here seen in Figures 2 and 3.

This caterpillar feeds upon the leaves of the butternut, hickory, persimmon, sumach (*Rhus*), sycamore, and walnut trees. Of the last-named we have a victim in Figure 4. This moth is rare in the North and nowhere abundant; while in the State of Georgia it is said to be double-brooded. In this genus *Citheronia* we have at least two more species of these big moths, namely the "Pine-devil moth" (*C. sepulchralis*) and the Mexican Walnut moth (*C. mexicana*). Of the former Doctor Holland says: "It ranges from the Carolinas northward to Massachusetts along the coast. It is not common in the valley of the Potomac; and at Berkeley Springs I have found it abundant in the larval state in the months of July and August."

The third species is found in Arizona and northwestern Mexico. To rear and study this elegant moth—indeed, any of our large moths—one has but to place the larvæ or caterpillars in a large and thoroughly clean pine box containing about a foot or more of soft, dark soil. The top should have a fine wire-mesh cover that can be readily removed. Fresh leaves of the sycamore or other trees mentioned above should be fed to them every day and

the unconsumed ones removed. After all the larvæ have disappeared under ground, the box may be kept in a dry and moderately warm room until the following summer, when your moths will be forthcoming—and what superb creatures they are upon emergence!

Butterfly larvæ, of a great many species, genera, and families, also feed upon the leaves of various trees of the forest, and among them we find not a few representatives of the genus *Papilio*, which is a truly gorgeous assemblage of forms; they may be reared from their chrysalids in the manner recommended in the last paragraph in the case of moths.

A few miles west of Washington, along the old Georgetown Canal, is a great place to meet with the Ajax Swallowtail—a butterfly of extreme beauty (Figures 5 and 6). There is a good reason for finding the insect in

that locality, as in the marshy area between the tow-path and the Potomac flourish many Papaw trees (*Asimina triloba*), and it is upon the leaves of these that the caterpillars of the various forms of this butterfly feed. On one occasion, in this locality, the writer captured three of these lovely butterflies with one sweep



Fig. 3. A PERFECT SPECIMEN OF A FEMALE OF OUR REGAL WALNUT MOTH; NATURAL SIZE, AND VIEWED FROM ABOVE

This well shows how carefully these moths are mounted in our great collection in the National Museum. In coloration, this is a very striking species, hence its name, "Regal."

of the net, as they rested on the mud within a few feet of the Potomac. Upon reversing the net, two were taken and one escaped. Doctor Holland gives us a beautiful colored plate of these zebra butterflies in his "Butterfly Book," upon which five different subspecies of *ajax* are shown, as well as *Papilio eurymeda* of the same group, the one shown in Figure 5 of the present article being

Papilio ajax marcellus—male. *Walshi* is the winter form of *ajax*, the "chrysalids which have been exposed to the cold of the winter" produce it; "the black bands of the wings are narrower and a trifle paler than in the other forms, the tails of the hind wings tipped with white, and the crimson spot on the inner margin near



Fig. 5. FEW BUTTERFLIES IN EASTERN UNITED STATES CAN RIVAL IN BEAUTY THE FAMOUS "SWALLOWTAILS;" AND OF ALL THAT GROUP THERE IS NOT A HANDSOMER SPECIES THAN THE ONE HERE SHOWN, WHICH IS WIDELY KNOWN AS THE "ZEBRA SWALLOWTAIL"

Butterflies of this zebra kind long puzzled the entomologists, for the reason that they were found to be seasonally polymorphic. The one here shown is the Ajax—a most remarkable insect.

the anal angle forming a conspicuous bent bar." In flight, this butterfly has the appearance of being white, banded with black (as in the cut for the under side), with the wings emarginated with a broad band of black; the red spot is quite conspicuous. It would seem that in certain localities these various types of *Papilio ajax* intergrade, making it a bit difficult sometimes to define and name them with absolute certainty. In any event, as it does a tree no good to have its leaves eaten up by caterpillars, and as the Papaw is a tree of some value along the streams that course through our forests, the caterpillar of this handsome butterfly must be considered in the light of an insect inimical to it.

Speaking of the early stages of the genus *Papilio*, Holland says that "the eggs are somewhat globular, flat-

tened at the base, and smooth. The caterpillars are cylindrical, smooth, fleshy, thicker in the anterior portion of the body than in the posterior portion, and are always provided with osmateria, or protrusive scent-organs, which, when the larva is alarmed, are thrust forth, and emit a musky odor, not highly disagreeable to the human nostrils, but evidently intended to deter other creatures from attacking them. The chrysalids are always attached by a button of silk at the anal extremity, and held in place by a girdle of silk about the middle. The chrysalids are, however, never closely appressed to the surface upon which pupation takes place."

It is surely very remarkable how the caterpillar can attach the delicate little girdle of silk that goes about its waist, or the "button" at its abdominal extremity, during the transformation performed through pupation. It has not been the writer's fortune to observe this up



Fig. 7. WE HAVE HERE AN ENEMY OF THE BLACK OAK—A BEETLE KNOWN AS THE BROAD-NECKED PRIONUS (*Prionus latifrons*)

During the first two weeks in July, this big, black Prionus emerges at twilight, and may frequently be captured around the street-lights of eastern cities. This is a Washington specimen.

to the present time, notwithstanding the fact that many papilionian larvæ have been kept by him during their transformation to the pupa stage, and, after that, until the butterflies emerge from them. The suspending girdle is invariably adjusted with the greatest care, in the same place, with the head of the pupa above, and the very

firm fastening of the tip of the abdomen below. This, it will be seen, holds the pupa in such a way that the median longitudinal line of its body makes an acute angle with the plane of the surface to which it is attached.

Thus hangs the pupa of a *Papilio*! But why it should apparently be obliged to be suspended in that manner, while the pupa of an *Argynnis*—such as one of our Silver-spots for example—should only be suspended by the end of the abdomen, is surely difficult to explain.

As has already been noted in a previous paragraph, the larvæ or caterpillars of our moths and butterflies feed upon the leaves of trees; but the beetles, upon the other hand, are far more destructive, for, as a rule, they attack the bark, the true wood within, and the roots. An excellent example of such insects is seen in the Broad-necked Prionus (*Prionus laticollis*) of Drury. In Packard's report on Forest Insects we find a cut of this species, with figures showing the larva and pupa, after Riley. The beetle is illustrated in the present article in Figure 7, which is from life. Generally, this insect

is discovered living in the trunks and roots of the trees known as the Balm-of-Gilead and the poplar; but Mr. F. Clarkson found, many years ago, specimens of this borer infesting the Black oak. He reported in the *Canadian Entomologist* (XVI, '95) that "their presence is quickly realized by the odor of the female, which is very powerful, and can readily be detected 20 feet distant. I placed a female, immediately after emergence, in an uncovered jar; and wherever I positioned it, on the piazza or elsewhere, the males were attracted from every direction.

I captured twenty males in a very few minutes. Oak Hill cannot boast of a Balm-of-Gilead or a Lombardy poplar, but it is famous for its oaks; and while it is admitted that the former trees as mentioned by Harris, serve as food for the larvæ, my observations indisputably prove that they feed also upon the roots of the oak."

This beetle is of a blackish brown color, shiny, and exhibits no markings whatever. It is a strong flyer; and when on the ground it gets along with considerable rapidity, especially when not impeded by the vegetation

or the coarse, pebbly character of the ground or soil. Frequently they make their appearance in the streets of our towns and cities at night, apparently attracted by the lights in the streets and windows of our dwellings. This Prionus is a hard, strong beetle, requiring a pretty stiff blow to crush it. Its jointed antennæ are of a fair length only, though stout and beautifully jointed with short joints. When at rest, each one exhibits a gentle curve outwards and somewhat backwards. Its eyes are rather large, while one of its most striking char-

acters is the unusual width of its neck, which, upon either outer margin, presents a pair of pointed processes, one in the middle and one occupying the supero-external angle. Its outer wings or elytræ are granulated, and so rather roughish; while mesially, the ultimate segment of the abdomen projects beyond them. Finally, we may say that its three pairs of legs, having the same color as the rest of the insect, are rather stout, but otherwise in due proportion to the size of the insect.



Fig. 6. ONE OF THE LOCKS ON THE GEORGETOWN CANAL IN THE EARLY SPRING OF 1919. A FEW MILES WEST OF WASHINGTON, D. C., AND A FINE LOCALITY FOR COLLECTING

Some of the finest sycamores anywhere are to be found in this region; sometimes they are seen to be double, as in this view.

GATHERING THE SPINULOSE SHIELD FERN

BY FRANK B. TUCKER

THE spinulose shield fern unexpectedly paid for my vacation several years ago. I never thought when I left New York late in August for a three-week vacation in the Green Mountains that I would return to the city with about as much money in my pockets as when I left. But such was the case.

While in no way bound to hide the identity of the place in Vermont where this happy windfall befell me, I do so, lest I give the village—if such it may be called—too great a prominence. It has but two houses that take vacationists. The largest may have accommodations for 40 guests; the smaller for a third this number. The native all-the-year-round population is about fifty.

The hamlet, for such it really is, is delightfully situated in a dilation of a valley of a branch of the Deerfield River, some nineteen hundred feet above sea level, with encircling summits rising another ten hundred feet. Save for the daily trip of a quasi public stage, that hires itself out for passengers, mail, baggage and freight, and an occasional automobilist on a tour of exploration, the place is unlinked to the busy world. And until the advent of the fern industry it contributed no article of commerce to the world.

About ten years ago a shrewd eyed native of the locality saw a fortune in the perennial crop of the spinulose shield fern that for countless years had grown prodigally in the moist woods roundabout. Stories are told of the penury of his circumstances before he conceived the idea of marketing the ferns, contrasted with his present affluence; but one and all acknowledge him as the benefactor of the community.

The spinulose shield fern I have seen growing in luxuriant abundance in the New England and Middle Atlantic States. Books on ferns state that it is to be found from North Carolina to northernmost Canada. I could not find it, however, in the mountains of western North Carolina, though I searched for it carefully. The books omit any mention as to how far west it grows—a question of some interest to me; for I was told that the Vermont crop was sold mostly to the florists of Chicago and Denver. Three feet is about its maximum growth; its width will average about one-third of its length. It is an ever-

green, very hardy, of a darker, richer green color than the other ferns that grow indigenous with it, and of a feathery, lace-like texture. Brown fruit specks dot its underside at picking time, and its stalk is somewhat scurfy.

It is very gregarious, six to a dozen or more stalks clustering about a common center, the clusters grouping themselves often into beds covering a considerable area. It grows in moist woods, being especially thick near water courses. It likes the cooling protection of boulders and of fallen, decaying trees. Often it takes root in the latter's crumbling, pulpy wood, or in some crevice of the former where a little soil has found lodgment, growing as hardy as its fellows in the fertile soil of the woods.

Picking begins about two weeks before Labor Day and lasts about five weeks. Everyone is welcome to pick; all are treated alike by the dealer. When the picking is good and the pickers numerous he pays them thirty cents for a thousand ferns, bunched. When the supply of ferns near his agency has been picked, and it becomes necessary to go deep into the woods for them, pickers are not so numerous, and the price rises to forty cents a thousand. While in the spring of years when his sales have been heavy, sometimes before the snow has left the ground, he pays them ninety cents for a thousand ferns, bunched.

During the height of the picking season some families earn as much as ninety dollars a week, clearing some five hundred dollars during the season. To do this means working from early morning until late at night for every member of the family. The men folks start out early in the morning with big hampers, which they fill and deliver several times a day to their women for bunching, at which task the men also assist at night.

The money the pickers receive is all profit, save for the cost of the thread used to bind the ferns into bunches. A few of the heaviest pickers do pay the larger landowners a nominal amount for the exclusive privilege of picking on their land. This exclusive privilege, however, is of somewhat doubtful value; for though the land thus allotted is posted against the unlawful picking of ferns, little heed is taken thereof by pickers.



READY TO START IN THE MORNING

The land upon which I was privileged to pick as the guest of the owner was posted, but I saw many poachers. Conditions could hardly be otherwise. The country is very sparsely settled and unpatrolled, so that the cost to owners of enforcing the prohibition against fern picking is out of proportion to the privilege they grant. The notices, however, have a moral effect, for each time I noticed poachers they hurriedly scurried away.

Picking is not work—at least for those who do not do it for a livelihood. Mornings are long for early risers, at many summer resorts, and would have been at my Vermont hamlet had it not been for the ferns. Each morning after breakfast we started out for ferns. Our host very kindly loaned us hampers, into the largest of which, by careful arrangement, almost three thousand ferns could be packed. By noontime our hampers would be filled and our stomachs empty; for walking and climbing over the uneven ground of the woods, bending to pick the ferns and toting the hampers about made ravenous appetites.

The woods in the year whereof I write were the cleanest I have ever known them. They were absolutely free of bugs and insects, of creeping and flying things of any nature whatever. Picking under these circumstances was ideal, and was thoroughly enjoyed by all. Competition to be the first to fill a basket lent zest to the picking. Surprisingly little was said by the pickers, once they got started. Everyone took an absorbing interest in the work,



BUSY BUNDLING THE FERNS

and labored as if their very subsistence depended on getting the hampers filled. A squirrel looking on could not have but remarked that we were as provident as he in supplying the winter's larder.

To one picking for the first time a little difficulty will be experienced during the first half hour or so of surely distinguishing the spinulose shield fern from the brakes that grow

all about it, often seemingly from the same root. This difficulty, however, is short lived. After a day's picking the question never arises in one's mind; while after a couple of days' picking, one can separate the fern from the



THE COVETED SPINULOSE SHIELD FERN

brake with the fingers, the sense of touch serving to distinguish the stalk of one from that of the other. And it is this sense of touch that distinguishes the expert picker from the beginner. A beginner chooses the ferns he picks solely by eye, and picks them one at a time. The expert gauges the size and quality of the ferns almost by the feeling of their stalks; and instead of gathering them one at a time his busy fingers take, in one operation, all those of the cluster that are of proper size. The ferns are not pulled up by the roots, but are broken off a few inches below the lowest frond.

It is hard to say which is the more interesting—picking the ferns or bunching them. Personally I prefer the picking, because of the exercise it affords. But as to which is the more fascinating I must admit that the palm goes to the bunching. A few men picking by themselves do their own bunching,

tying the bunches with thread from a spool carried in the pocket and run through a buttonhole. Most of the bunching, however, is done at night. A picker who does not do his own bunching, pays half what the ferns sell for to have them bunched.

I have seen a room full of people alive with laughter and jovialty before bunching began, gradually subside into a seeming contented watching of the silent bunchers; then as gradually to take a livelier interest in the work, and finally to actively participate. Once the whole



AFTER A GOOD MORNING'S WORK

room was bunching it became a silent race to see who would finish first, and who would have the greatest number of bunches, for it was always something of a lottery as to how many ferns a basket contained.

The ferns are put up in bunches of twenty-five. Each bunch must contain an assortment of sizes, varying from about nine inches to eighteen inches. The largest is laid on a table or other flat surface, and the others on top of it. The stalks of the twenty-five ferns are then bound together with a piece of thread. Time is not wasted to tie the thread; the end is simply wedged between the stalks.

The bunched ferns are delivered to the dealer usually in the same hamper used in picking them, with a memorandum of the owner's name and count. The dealer's agents verifies the count and so expert has he become in the handling of bunched ferns that he is able to tell pretty closely from the heft and appearance of a bunch whether it contains twenty-five freshly picked, well conditioned ferns. Saturday is pay day for the pickers. A record of the number of bunches delivered by each picker is carefully kept; and any time after the money arrives, a picker may collect his account. The certainty of the pickers receiving their money when due, and the acknowledged fact that the industry is a boon to the hamlet, seem to have been

elements in the success of this dealer. One's first thought on seeing this industry is to engage in it as a dealer rather than as a picker. But closer observation shows

this to be easier thought of than done. An organization of quite a size is necessary for its conduct. The ferns have to be kept in cold storage. The wastage is great, and considerable care is necessary to shield the fern from injury. If kept too long piled at the receiving station, it will begin to sweat, which is detrimental to its preservation. It seems also to be subject to a blight, which attacks it as a brown discoloration, and pickers are warned to allow no such ferns to be found in their bunches.

In the case whereof I write, the dealer had to pack his ferns in crates and truck them thirteen miles to the railroad, which took them twenty miles farther to his warehouse. At his warehouse he had to reinspect, re-sort and rebunch the ferns. From the locality where I picked he took ninety million ferns the previous year, how many more from other localities I did not

hear. When he started business he must have found the nearby markets quite fully supplied, and had to develop new ones. In no other way can I explain his sending them to such a distance as Chicago and Denver from Vermont.



ON THE WAY TO DELIVER

ATENTION is being given by the United States Forest Service to the importance of landscape engineering in the National Forests. One of the questions continually arising involves the proper way to lay out a summer camp site to make the most of the natural beauties of a location. Another has to do with the principle to be followed in running a scenic trail to insure the best views for the traveler. Still another deals with making ranger stations most attractive as dwelling places and the creation of designs which will best harmonize with the surroundings. To meet these and kindred questions Dr. Frank A. Waugh, an eminent landscape engineer of Amherst, Massachusetts, has visited a number of the Forests where recreation use is especially important. His trip was made at the request of the Forest Service. As a result he has prepared a report setting forth some simple principles of landscape engineering applicable to the various questions. These are intended to provide a basis for correct landscape engineering practice in the National Forests.

THE National Lumber Manufacturers' Association, with headquarters in Chicago, has compiled a handy reference of "Information on Wood and Where to Find it." This booklet is a directory of literature which may be had for the asking from the National Lumber Manufacturers' Association, California Redwood Association, North Carolina Pine Association, Northern Hemlock and Hardwood Manufacturers' Association, White Pine Bureau of St. Paul, Minnesota, Southern Cypress Manufacturers' Association, Southern Pine Association, West Coast Lumbermen's Association, Western Pine Manufacturers' Association and other sources, and is absolutely free.

Some of the subjects covered include: Barns, bee hives, bird houses, boats, bridges, bungalows, cars, canoes, cattle sheds, chicken houses, corn cribs, dairies, docks, factories, farm buildings, fences, freight cars, furniture, garages, incubators, kitchen cabinets, schools, silos, toys and warehouses.

THE HERONS

(Family Ardeidae)

BY A. A. ALLEN, PH. D.

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

WHEN nature evolved the herons to enliven the shore, she did not take into account the avarice of man nor the vanity of woman. She created birds that should have stood for all time as the emblem of grace. Take away life and there remains an ungainly mass of spindly legs and crooked neck worthless even for food. Nature might have expected, therefore, that the herons would be allowed to live and delight the eyes of mankind forever. Unfortunately, however, she decorated certain of them during the breeding season with most beautiful and delicate plumes which retain their beauty even when ripped from the backs of their owners. Shrewd milliners, taking advantage of the vanity of women and the relentlessness of fashion, saw in these plumes great fortunes. Fashion and ignorance did the rest, so that today the most beautiful species, the egrets, are nearly extinct. Indeed they might long since have

been so had it not been for the determination of a group of bird lovers, who formed the National Association of Audubon Societies, and for the far-sightedness of a nature-loving President, Theodore Roosevelt, who set aside certain areas of waste land as Federal Bird Reservations to give the vanishing birds a last resort of safety.

There are about 100 species of herons in the world, found mostly in tropical and subtropical regions, but at least a dozen are found in the United States and Canada.

They vary in size from the least bittern whose body is not much larger than a robin's to the great blue heron that stands about four feet in height. In color they vary from the streaked brown plumage of the bitterns, through various shades of chestnut, blue and gray, to the snowy white of the egrets. They are variously ornamented with elongate feathers, either on the crown, foreneck, or as in the egrets, on the middle of the back.

In the bittern there are some fluffy white feathers beneath the wings that are displayed during the courtship performances.

The majority of herons are gregarious birds, roosting and nesting in colonies. They scatter when fishing, however, and hunt singly, either stalking quietly through the shallow water or resting motionless on the shore waiting for some hapless fish to swim within reach of their javelin-like bills. One species, however, the reddish egret, is said to run rapidly through the shallow water

in pursuit of small fish. Most herons nest in the trees or large bushes of extensive swamps but the bitterns nest on the ground in treeless marshes. Herons' nests are always poorly made structures of sticks, so thin that the pale bluish or greenish white eggs can usually be seen from below.

Young herons are covered with long shaggy down when hatched and even before they acquire their real feathers, they are able to climb from the nest and cling



Photograph by O. E. Baynard

WHERE AIGRETTES COME FROM

They are worn on the back of the beautiful egret herons during the nesting season. Egret at nest at Orange Lake (Florida) Rookery, an island bought and guarded by the National Association of Audubon Societies.



Photograph by Verdi Burtch

SKY SCRAPERS

Great Blue Herons nest in the tallest trees of big swamps—Single trees sometimes contain from five to ten nests.

to the branches using their wings and even their necks to assist them. If they drop into the water below, they are able to swim, using their wings as well as their feet for propulsion, but their heavy bodies sink until only the head shows above the surface. When alarmed in the nest or on the branches, the young herons stretch up their long slender necks and remain perfectly quiet so that they look more like sticks than like birds. They are fed in an unusual way. The old bird, having swallowed the fish or frogs which it has caught, returns to the nest with them in its crop. The young bird then seizes, with a scissor-like action, the base of the bill of the old bird which turns its head on one side and vigorously but deftly disgorges the food into the throat of the



Courtesy of National Association of Audubon Societies

THE COST OF A PLUME

This pathetic picture tells its own tale and needs no enlargement.

young. The process is rather difficult to describe in a few words but a glance at the accompanying photograph of the least bittern feeding its young should make it clear.

Three members of the heron family in North America are called bitterns and they inhabit the reedy marshes



NOT IN HIS ELEMENT

Young herons are not meant to swim like ducks but they get there just the same when they fall from their nests into the water.

rather than the tree covered swamps that are the favorite nesting places of the other herons. The American bittern is the larger of the two, being about the size of a large fowl, but of a very different shape, although some people call it the "mud hen." Its streaked brown coloration matches so closely the dead vegetation in the marsh that when quiet it is almost impossible to see. This camouflage is furthered by a habit which the bird has when alarmed, of pointing its bill toward the sky and presenting only its broadly streaked neck and breast toward the intruder. As one circles about the spot where he knows the bittern is hiding, the bittern also slowly rotates so as to present always the same color pattern which matches exactly the lights and shadows of the reeds, and when the wind blows over the marsh, causing the reeds to sway, the bittern seems to perfect the simulation by swaying with them. Early in April when the bittern returns from the south and concealment in the marsh is scarce, it is easily overlooked because it resembles some broken snag projecting from the water. One of the most striking characteristics of the bittern is its call which has given rise to the names "stake driver" and "plum puddin." Though not actually very loud the sound is remarkably

penetrating and can be heard for a distance of half a mile or more. The first part of the performance which sounds like the tapping of a wooden stake with a mallet is made by the bird snapping its long bill. Then follow some deep liquid notes that sound like the "working of an old fashioned wooden pump or "pouring water out of a huge jug;" *ooble-oob, ooble-oob, ooble-oob*. The sound is accompanied by curious gulping contortions but the bill is not held in the water nor is it filled with water as was once supposed.

The bittern nests on the ground, usually in the sedges fringing the marsh, but occasionally it builds its nest where the water is deeper. The eggs are about the size of small hens eggs and look as though they were stained uniformly with coffee.

The least bittern looks like a fair sized bird when seen on the wing or when sneaking through the flags, but it is

of the parts which are buff in the least bittern are a rich chestnut in the Cory bittern. It is a very rare bird as only about thirty specimens have ever been found and inasmuch as these have been scattered over a large part of the range of the common least bittern, from Florida to Ontario, many ornithologists now believe that it is

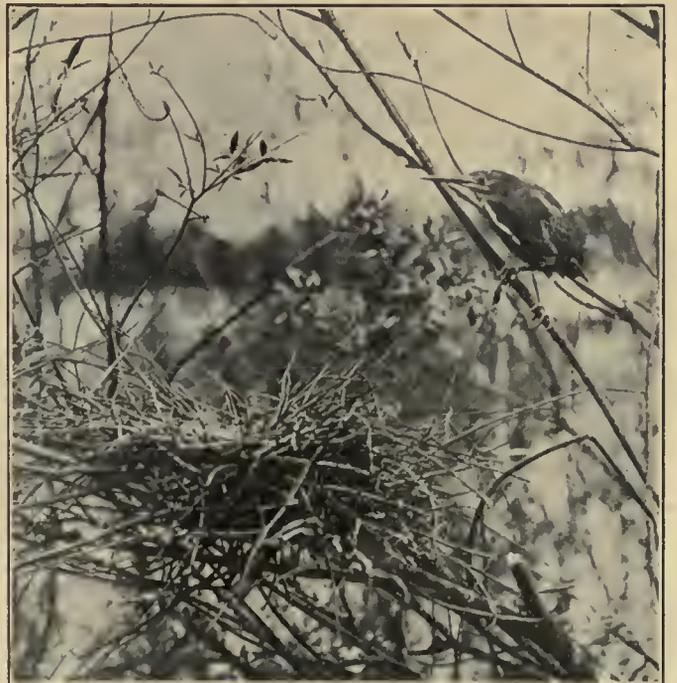


COFFEE COLORED EGGS OF THE AMERICAN BITTERN

They are laid on a platform of reeds, usually in the dryer parts of the marsh.

merely a color phase of the least bittern similar to the red phase of the screech owl. The term erythronism has been applied to this phenomenon where an excess of red pigment is developed.

Of the true herons, the little green heron is undoubtedly the commonest and most widely distributed. It is a



"BE IT EVER SO HUMBLE"

A Green Heron approaches its crude nest of sticks in the willows fringing a pond.



Photograph by O. E. Baynard

SCENE IN A PLUME HUNTER'S CAMP

Egret feathers mean the death of hundreds of birds and the starving of thousands of young.

mostly neck and legs and its body is relatively small. It has much the same habits of concealment as its larger cousin but its notes are very different, resembling the distant croaking of a frog or the slow cooing of a dove. Its nest is a platform of rushes built above the water, usually in the cat-tails or reeds, and its three to seven eggs are more like those of other herons, being pale bluish-white.

The writer once had the experience of tramping through a marsh and discovering one of the nests of this bird and actually counting the eggs before he realized that the bird itself was standing on the back of the nest, so completely did it simulate the dead stubs of cat-tails all about it. This particular bird seemed not to know fear and when it finally realized that it had been seen, it assumed an entirely different, threatening attitude and prepared to defend its nest with vigorous blows from its sharp bill.

A third species, the Cory least bittern, is practically identical with the common least bittern except that all

bird about the size of a crow and indeed at a distance, when on the wing, looks not very different, for, like other herons, it carries its head back on its shoulders and conceals its length of neck. It furthermore makes up for

its abbreviated tail by trailing its legs out behind. At close range, however, it is seen to be very different for, although it is not very green, it is certainly not black



A BITTERN ROOST

The Bittern pulls together the tops of the reeds with his long toes, gives them a twist and makes a comfortable bed on which to sleep above the water.

like a crow. Its crown and wings are greenish but its conspicuous neck and breast are largely chestnut and its back is bluish gray.

The little green heron differs from others of the true herons by leading a more solitary existence, seldom more than a single pair nesting in one clump of alders or willows. When



Photograph by Verdi Burtch

AN AMERICAN BITTERN "NOT AT HOME"

When she does not wish callers she assumes this position and usually goes unseen.

frightened or upon taking wing, the green heron usually utters a rather harsh "skeow" and its vocal powers, even during the nesting season, are never much more musical.

The next best known species of heron is the great blue heron, in some districts misnamed the "crane." It is very much larger than the green heron, standing about

four feet high and having a wing expanse of about six feet, even greater than that of an eagle. Its general color is grayish, lighter on the head and neck, with a black belly and a black stripe through the head. It nests in colonies in the larger swamps, usually in the tops of the tallest trees, one tree often containing from five to ten nests. The tops of the trees are usually killed by the excrement of the birds but the herons continue to use the same trees as long as they will hold their nests. In some



LOOKS LIKE A BITTERN

But is an immature Black-Crowned Night Heron.

of the treeless regions of the west, the great blue herons nest on the ground in the marshes or in bushes on islands.

The herons are powerful flyers, traveling with measured beats of the wings and occasionally sailing so that they are able to feed many miles from their nesting grounds. When the young are ready to fly in late July or August, they scatter to all parts of the country wherever there is a good feeding ground. At such times they are unsuspecting and many are killed by the amateur marksman for, unfortunately, even in such progressive states as New York, they are not given protection by law. This is be-



BIRD OR BROKEN REED?

The Least Bittern assumes this position when alarmed and usually escapes detection.

cause a few fishermen believe that they are destructive to trout when, as a matter of fact, trout form a very small part of the diet of a very few individuals and these could advantageously be dealt with in other ways than by removing protection from the entire species. Fortunately real sportsmen are as fond of the herons

ing out at dusk when their loud "quas" are familiar sounds in parts of the country where they are found. They nest in large colonies like the great blue herons but usually in smaller trees and sometimes in woods even at a distance from water.

The yellow-crowned night heron is a very different looking bird, confined to the marshes of the southern states and thence southward into the tropics. It nests in pairs along streams or associated with colonies of other herons.

One of the commonest herons of the southern states is the little blue heron which, because of the lack of ornamental plumes, has been allowed to survive even in large colonies. It is about the size of the little green heron and like it has a chestnut head and neck. The crown is the same color as the rest of the head, however, and the entire upper parts are dark slaty blue. The immature birds are pure white except for the tips of the wings and look very much like snowy egrets but, of course, do not have the ornamental plumes. Mottled individuals in the process of changing from white to blue are often seen.

A somewhat larger species but similar in color, except for the white on its under parts, is the Louisiana heron which in parts of Florida still occurs in rookeries containing thousands of birds. A still larger species and much rarer is the reddish egret which differs from both the little blue and

Louisiana herons in having a tuft of about thirty "aigrette" feathers growing from between the shoulders during the breeding season. It likewise has a white immature phase which was once thought to be a distinct species and called "Peale's heron."

The best "aigrette" plumes are found on the two white egret herons in which the "aigrettes," like the rest of the bird are snowy white. The larger egret approaches a great blue heron in size while the snowy egret is but little larger than the little green heron. Both species have about fifty straight plumes growing from be-



A NOVEL MARKET BASKET

The Least Bittern brings back the fish and frogs to its young in its throat and regurgitates them as shown in the next picture.

as they are of the fish and many an ardent disciple of Isaac Walton is willing to share even his trout stream with the herons for the sake of having them about.

The same may be said of the bitterns which are likewise denied protection. Occasionally an unfortunate bittern takes up its residence in a marsh bordering a trout stream and in his hunt for frogs and tadpoles may occasionally catch a trout fingerling. The vast majority of bitterns, however, live in the warm marshes where trout are never found and where they fall easy victims to the Sunday sports in their rowboats and the small boys with Flobert rifles hunting for the largest targets they can find.

The black-crowned night herons are about the size of the bittern and indeed the immature birds closely resemble them though the adults are entirely different, being nearly pure white or pearl gray in color with black crowns and mantles. They are nocturnal in their habits, usually roosting in trees during the day and com-



BREAKFAST A-LA-MODE (HERON)

The old bird turns its head on one side and the young grasps the base of its bill. Breakfast is served by vigorous pumping of the old bird's throat.

tween the shoulders and extending beyond the tail.

Forty or fifty years ago both species were common all through the south and especially in Florida but today they are the rarest of the herons. Were it not for the bird reservations and the non-sale of plumage laws, it



ONE OF THE RAREST OF NORTH AMERICAN BIRDS—THE CRY LEAST BITTERN

Many ornithologists believe it to be a color phase of the common least Bittern. Photograph of a wounded bird.

is probable that they would now be practically extinct. Twenty years ago every woman of fashion wore "aigrettes" in her hair or on her bonnet. Today, if she does so she will be arrested as it is against the law to have them in one's possession. Doubtless they will now go "out-of-style" though there are still a few foolish individuals who cling to their once valuable plumes in the hope that the laws will be repealed and that they will once more come into fashion; and this in spite of the fact that they know that each set of plumes means the death of a breeding bird and the starving of a nest full of young.

There is another white heron found in southern Florida called the great white heron. It is about the size of the great blue heron and has no plumes. There seems likewise to be an intermediate form between the Florida great blue or

Ward's heron, as it is called, and the great white heron. It resembles the Ward's heron but has a white head and neck. It has been called Wuerdeman's heron but its true status is not yet known.

In some parts of the country the herons are incorrectly called cranes, which, indeed, they resemble, the differences between them being more of anatomy than general appearance. In flight the herons always carry their heads back on their shoulders while the cranes carry



PRESENT BAYONETS

A Least Bittern defending its nest when it knows it has been discovered.

their necks fully extended. The herons bills are more or less angled while the cranes are rounded and the herons have all four toes well developed and on the same level while the cranes have the hind toe small and elevated. Cranes, moreover, are now rare in all parts of the country and have been practically exterminated in the east.

CARRIER pigeons will assist in protecting the forests of Oregon and Washington from fire, if experiments inaugurated in this district by Forest Examiner W. J. Sproat prove successful. Mr. Sproat has had some experience with the use of pigeons and believes they will be a valuable means of communication in emergencies and for carrying reports of fire and other

messages. The matter has aroused interest in the district office, and the birds will be tried out on several of the forests during the coming fire season. Mr. Sproat will take back to Bend with him five pairs of the birds for use on the Deschutes. Supervisor Sietz also plans to try them out on the Cascade.

SCOTCH LUMBER CUT BY NEW ENGLAND MILLS

The report of the operations in Scotland of the New England Saw Mill Units has been published by E. C. Hirst, State Forester of New Hampshire, who was in charge of the particularly interesting operations.

ABOUT a month after the United States entered the war the Massachusetts Committee on Public Safety learned that Great Britain was in distress for lack of skilled lumbermen and foresters to cut her timber. It was at once proposed that New England should raise, equip and send to England ten portable saw mill and logging units. The British gratefully accepted the offer, it was unofficially approved by Secretary of War Baker and receive the enthusiastic support of the Governors of the New England States.

To work out the details of the undertaking and to make its operation effective the Massachusetts Committee on Public Safety appointed a committee of which the chairman was W. R. Brown, of Berlin, New Hampshire, a director of the American Forestry Association and a member of the Lumber Committee of the Council of National Defense. The other members of the committee were: James J. Phelan, Vice-Chairman, Massachusetts Committee on Public Safety; Harold G. Philbrook, Treasurer, Vice-President, Connecticut Valley Lumber Company; F. W. Rane, Secretary, State Forester of Massachusetts; George S. Lewis, Treasurer, Connecticut Valley Lumber Company; Philip T. Dodge, International Paper Company; H. W. Blanchard, H. W. Blanchard Lumber Company; Garrett Schenck, Great Northern Paper Company; Hon. Herbert B. Moulton, Parker and Young Company; I. B. Hosford, St. Croix Paper Company; Martin A. Brown, Woodstock Lumber Company; George E. Henry, J. E. Henry and Sons; Samuel H. Boardman, President Eastern Shook and Wooden Box Association; J. M. Parker, St. John Lumber Company; Marshall T. Wood, Lande Manufacturing Company; H. B. Stebbins, H. B. Stebbins Lumber Company; Chester C. Whitney, Perry Whitney Lumber Company; J. H. Hustis, Receiver, Boston and Maine Railroad; L. S. Tainter, Conway Lumber Company; E. C. Hirst, New Hampshire State Forester; Forest H. Colby, Maine State Forester; W. O. Filley, Connecticut State Forester; J. B. Mowry, Rhode Island State Forester.

It is significant of the scope and influence of the American Forestry Association that of the 23 members of this committee twelve are members of the Association. This representation includes, in addition to Chairman Brown, Messrs. Philbrook, Rane, Dodge, Blanchard, Martin A. Brown, Henry, Tainter, Hirst, Colby, Filley and Mowry.

To send ten units for saw mill and logging operations in England involved the raising of a fund of \$120,000. The cost of each unit is placed at \$12,000. This money was provided over night. Through its Governor and its

committee on public safety each of the New England States subscribed the sum required for a single unit. With six units thus provided for, there was no difficulty in raising funds for the four remaining units by private subscription among the paper manufacturers, lumbermen and timberland owners of New England.

The following report on the work of the units is made by Manager Hirst:

The commercial timber in Scotland is in plantations on large estates. There is practically no natural growth. The plantations were set out partly to afford game cover and partly on account of the land owners interest in timber growing. For many decades prior to the present war there was little commercial incentive for planting anywhere in the United Kingdom. Cheap transportation permitted duty free lumber from Russia, Sweden, Norway, Germany and even America to be delivered to consuming centers in England and Scotland at such low prices that investments in home grown timber yielded a small and uncertain return. National emergencies have from time to time stimulated felling and planting. Thus, on a considerable part of the woodland operated by the New England Saw Mill Units the previous clear cutting furnished lumber for the Napoleonic Wars, and the trees planted soon after were of splendid size to furnish high grade dimension lumber during the last year.

The most important commercial trees in Scotland are Scotch pine, larch and Norway spruce. The first named is that planted in largest amount, the trade name for the lumber being "Scots Fir." In quality the lumber is about half way between our white pine and Norway pine. The larch is a native of the Austrian Tyrol and although planted for centuries in Britain, seed is still obtained from the native home of the tree on the continent. The larch furnishes excellent structural timbers, but is springy and more difficult to saw to accurate dimensions than the others. The Norway spruce is a rapid grower and much like our white spruce. It is planted only on moist ground.

The war found Great Britain in a serious situation in regard to timber for military purposes. Much greater supplies of timber were needed for war than had been anticipated and enemy submarine activities soon became a serious hindrance to securing timber from over seas on which the country had become accustomed to depend. It was necessary for the Government to organize a Timberland Supplies Department, and then immediately to requisition and purchase timber from private estates for the war industries of Britain as well as the large amounts which it became necessary to ship across the Channel for

military purposes in France. Military contingents from the Dominions over seas were required to carry on lumbering operations on a scale large enough to supply the war industries. It was to help out this serious situation that the New England Saw Mill Units were organized.

The small timber supplies of Great Britain have been very heavily depleted by the war cuttings and these conditions have awakened the country to the need of larger areas of forests. The Reconstruction Committee of Great Britain have recommended the establishment of a Forestry Department in the Government whose duty it shall be to support a public policy of timber growing, adequate for the country. This Department was established prior to the termination of hostilities.

The headquarters of the New England Saw Mill Units was at Ardgay, Ross-shire, Scotland, a village at Bonar Bridge Station on the Highland Railway, about fifty miles north of Invernes. A storehouse was built for the supplies needed for the mills and camp kitchens. Here the headquarters was located and the supplies for the men and horses were checked out to different units each week. All mills were located within five miles from headquarters, three operating on a timber tract purchased by the Government from Andrew Carnegie in Southland-shire and seven operating in a tract bought from Sir Charles Ross, in Ross-shire. These tracts were estimated to carry about 6,000,000 and 18,000,000 board feet respectively. The saw mill equipment arrived about the middle of July and lumber production got under way in August.

When manufacture first began in August the lumber produced was sent to port for shipment to France. Later in the fall specifications for France were cancelled and from then on practically all shipments were made for British war industries. About 60,000 railroad ties were railed from our loading bank at Bonar Bridge and a large amount of 3 and 4-inch dimension timber was made. A considerable part of the dimension timber was cut for special requirements. Very little lumber was wasted in the slabs, as round edge boards were taken off the outside edge of the logs when sawing dimension material. A great deal of pitwood was produced in the woods operations for use by the colliery companies. These were made from the tops and large limbs. This pitwood was graded into 3, 4, 5, and 6-inch diameter sizes, the length ranging from 6 to 14 feet. In cost accounting it is considered that one lineal foot of pitwood is equal to one board foot of manufactured lumber. The total production by the New England Saw Mill Units was 19,673,100 board feet of lumber and pitwood.

Sir John Stirling Maxwell, under whose direction the New England Units worked in, said of them: "The ten mills played a notable part in providing for Great Britain's timber needs. Their output man for man through the twelve months of your stay has been the highest that any operation under the charge of the Department can show. The type of mill you brought over, standing as it does midway between the large mills of the Canadians and the small mills of this country, has proved

admirably adapted to the timber you had to work and most economical of labor. While admitting the great benefit derived from the larger type of mill in providing the armies in France with quick supplies of trench timber and railway ties when speed was everything, most experts are agreed that the smaller type is likely to prove best in normal times in a country like this where the blocks to be felled are small and economy is the first object. Your mills represented a compromise between the two, singularly apt to the moment of your arrival. It would be easy to expatiate on the international value of your timely aid. It is on such acts that friendships are built. A gush of praise or gratitude can only spoil them and there has been nothing in the attitude of your colleagues or yourself to invite it. New England saw her help was needed and she gave it and we welcomed it. That is all. But you and I know that we have not worked together without losing some old prejudices for which newspapers, tourists and the too wide Atlantic are responsible, or without realizing how refreshing and fruitful the intercourse of friendly nations can be when they speak the same tongue and value the same things."

STATE Forester Alfred Gaskill, of New Jersey, has announced the purchase of 1,400 acres of timber land in Woodland township, Burlington County, by the State Department of Conservation and Development of New Jersey. This land increases the area of the Lebanon State Forest and joins several detached state-owned areas into a compact unit capable of more efficient management.

There are now six state forests in Burlington, Ocean and Sussex Counties, each under the charge of a resident forest ranger. The forests are being protected from fire and abuse, the production of timber is aided and encouraged, technical forestry studies and experiments of value are carried on, timber and wood products are sold when their removal is beneficial to the forests, and roads, trails and camp sites are developed for public use.

J. GERRY CURTIS, for some time past Assistant Forester of the city of Pittsburgh, has been appointed Forester and landscape engineer for the Carnegie Steel Corporation, in charge of the extensive work in planting, etc., now under way in connection with the construction of several hundred new homes for employees of the mills. A "home beautification" policy has been adopted and the streets are to be lined with shade trees, the front-yards dotted with flower beds and shrubbery masses, while fruit trees and berries are to be used extensively in the back-yards. The back-yard fences in the older settlements also are to be removed and hedges of barberry substituted. Back-yard garden clubs have been organized and prizes will be awarded each year for the best vegetable and flower gardens. The fact that special stress is to be laid on the training of the children in the care and protection of trees, shrubs and flowers plants promises well for the success of Mr. Curtis' plans.

EDITORIAL

WHY WE NEED MORE FOREST RESEARCH

ONE of the biggest economic problems before the United States is the production of wood to meet the future needs of our growing population and industries. No one at all familiar with present conditions can doubt that a very serious shortage of timber, with attendant high prices, hardship for consumers, and hindrance to the economic development of the country, will be upon us within a very few years unless vigorous action is taken immediately to insure continuous forest production on forest lands.

A movement, which has already a large measure of popular support, is under way to bring about this continuous production, not only from the public forests but also on the much greater area of privately owned forest land. But it must be borne in mind that the unanimous support of the public, of the law-making bodies, and of the forest owners themselves, will not suffice to insure the production of the right material in quantities sufficient to meet our future needs. Forest protection, conservative cutting, reforestation, restriction of cut to annual growth, will result in continuous crops of some kind of timber, but if undertaken in a haphazard way will not result in continuous crops large enough to meet even our present needs, nor is it at all certain that we shall have either the sizes, grades, or even the species of lumber which will be needed.

When good land is cheap, production and transportation costs low or nil, population sparse, there is little need for study of methods to increase food production, or of selection of varieties to plant. The Indian in the Tropics, who has only to go out and gather food which grew without any effort on his part, has no need to indulge in agricultural research. But with a highly developed civilization, with its ever-increasing population and resultant decrease in per capita area of agricultural soil, with increasing costs of production, and with the necessity of carrying the products of the soil long distances to the consumer, it becomes imperative to investigate methods by which a maximum amount of food can be produced, at the lowest practicable cost, on soils best adapted for each particular kind of crop. It is also necessary that the production of different kinds of foods bear some relation to the requirements of the consumers for the various products. It would not do to devote all agricultural land to the raising of cereals, for instance, even if it should be found that the maximum number of calories of food could be produced by doing so.

In forestry the same rule holds. The "timber-miner," who only harvests what Nature produced, and cares nothing for the future, has no use for forest research. But for a growing nation, whose forests under present methods are producing but a fraction of its needs, and even under the best methods that can be applied with our present knowledge will produce little more than enough for merely present needs, such research is of fundamental importance.

Foresters have yet barely scratched the surface in the study of American forests. It is not enough to know that certain methods of cutting in the Southern Appalachians, for instance, will be followed by reproduction, and that such reproduction will grow rapidly and produce valu-

able timber. It is necessary to know what method will produce the *most valuable timber*, or the timber which will best meet the national needs, and at the most reasonable cost; it is necessary to know just what species or mixture of species will succeed best under each given set of conditions; it is necessary to be able to say definitely in advance just what will be the yield of a given species managed in a given way on a specific tract of land, and what it will cost to produce it.

From the standpoint of the private owner it will not be enough to say that by adopting such and such a method he will make a profit; he wants to know how he can get the *largest possible* return from his investment in land, labor, and money. From the standpoint of the nation, it is not enough to know that certain methods will result in continuous forest production on forest soils; it is necessary to know which of several methods will best accomplish this result, and what methods will insure the proper proportion of different sizes and of different grades of material, and of different species.

We have reached a turning point in the development of forestry in this country. There are ample social, economic, production and growth data to clearly show the need for a change in our methods of handling our timber lands. No further data are necessary to prove to any intelligent observer of our forest conditions that unless our cut-over lands, unsuited for agriculture, are turned back into forest production, we shall in the near future be at a serious economic disadvantage.

Foresters have a sufficiently well worked out plan for remedial legislation, and enough of basic knowledge for formulating some simple silvicultural procedure by which to maintain continuous production in each forest region. But even as it is, if the forestry profession were confronted tomorrow with the responsibility for drawing up a plan of management for all the forest lands of the United States, it would be put to a severe test, just as was the case at that time of the placing of the National Forests under forest management.

The Forest Service found it necessary to establish eight or nine experiment stations to solve the technical problems that immediately arose in marking timber, in working out methods of brush disposal, methods to secure natural reproduction, methods of artificial reforestation, and similar problems. If the profession, therefore, is not to be content with merely securing some kind of growth on cut-over land, no matter how inferior it may be as compared with the original stand, but desires to be able to secure forest growth of the highest economic utility, it must set itself at once to the task of securing more fundamental facts upon which to base its practice on the vast area of privately-owned timber land.

The only way in which such data can be obtained is by long-continued, painstaking, scientific research. They cannot be obtained in a year or in a few years as in the case of agricultural investigations which deal with annual or biennial crops, but require long periods.

Is it not time that such research be started on a very much larger scale than has been undertaken hitherto, in order that when the mandate comes, we foresters shall not be found lacking?

SEAPLANES TO BE USED FOR FOREST FIRE PATROL WORK IN QUEBEC

BY ELLWOOD WILSON, EDITOR, CANADIAN DEPARTMENT

THE Province of Quebec has reason to be proud of itself. After many difficulties, which at many times seemed insurmountable, two seaplanes for use in forest fire patrol and mapping have been obtained and the first machine has been flown from Halifax, Nova Scotia, to Lac la Tortue, a little village about two miles from Grand Mere, and is in actual use for patrol work. About three years ago the Directors of the St. Maurice Forest Protective Association discussed the practicability of using airplanes for patrolling, and a committee was named to look into the feasibility of the plan. They reported that it seemed practicable and in nineteen seventeen an effort was made to get a machine and pilot, without success. In nineteen eighteen another effort was made to put the scheme into practice. On Christmas Day, 1918, Mr. Allard, the Minister of Lands and Forests, sent for the writer and told him that he was much interested in the idea and would contribute \$2,000 toward an experiment. At the annual meeting of the St. Maurice Forest Protective Association a sum of ten thousand dollars was voted. The writer, after considerable study, decided that owing to the difficulty, amounting practically to an impossibility, of providing landing places for airplanes, that seaplanes were the only machines possible. It was learned that the Department of Naval Affairs of the Dominion Government had in storage at Halifax 12 seaplanes turned over to it by the American Navy at the signing of the armistice. The Department was asked, through the Acting Minister, Hon. A. K. McLean, to loan two of these machines. After much consideration and discussion he agreed to loan them and an agreement was entered into to take over these machines. The Minister of Marine, the Hon. C. C. Ballantyne, who had been absent in California on account of serious illness, returned to Ottawa and at once decided that he would not loan the machines, and he said that proper safeguards for their return to his Department had not been put in the agreement. However, after a long discussion of the matter, he finally consented to allow the machines to be loaned on the original agreement. Much credit is due to the two gentlemen named above for their action in making possible this experiment. The Montreal Branch of the Aerial League of Canada also co-operated in helping to get these machines, by sending a deputation to Ottawa to see the Minister, and by many helpful suggestions. The President, Sir Charles Davidson, gave much needed legal advice and helped in other ways.

The pilot engaged by the Association, Lieut. Stuart Graham, of Montreal, had

had experience with both airplanes and seaplanes, having served in the Royal British Naval Air Service and having been decorated for sinking a German submarine after his engine had gone dead. He went to Halifax and with his engineer, Mr. Kehre, and with the help of the officers of the Halifax Station, assembled seaplane No. 1876. He left Halifax on the afternoon of June 5 and flew to St. John, New Brunswick, without any trouble except a fog which lifted just as he reached St. John. He remained there over night and left the next day for Lac Temiscouata, Quebec. In flying across the State of Maine, he encountered a heavy thunderstorm and seeing a lake of the same shape as the one he was looking for made a landing, only to find that he was on Eagle Lake, Maine. He remained there over night and flew to Lake Temiscouata the next morning. He had ordered gas and oil sent there but it had not arrived so he was forced to take automobile gasoline and go on to Riviere du Loup on the St. Maurice. On the morning of the 8th of June, the sea water was very rough and a high wind and strong tide, and in trying to take off the nose of the machine went entirely under water drenching Mrs. Graham, who was in the forward seat acting as navigator. He left Riviere du Loup at 1 P. M. passed over Quebec City at 2.25 and arrived at Three Rivers at 3.10. Here he was met by Messrs. R. F. Grant, President, and Mr. Henry Sorgius, Manager, and Ellwood Wilson, a Director of the St. Maurice Association. At the wharf the Hon. J. A. Tessier, Minister of Roads and Mayor of the City of Three Rivers, formally welcomed Lieut. and Mrs. Graham, the Mayoress presenting Mrs. Graham with a bouquet of beautiful flowers. After a rest the party took the air at 6.50 and arrived at Lac la Tortue at 7.10. The trip was made without incident or mishap of any kind, the four hundred horse power Liberty engine never missing a stroke. The plane seems to be ideal for work over forests such as those in Quebec where lakes for landing abound. Its gasoline capacity is a little low for long flights. The machine lands and takes off beautifully. Mrs. Graham has named the first machine "La Vigilance." Lieut. Graham leaves the 11th of June for Halifax to bring up the second machine and will then commence his patrol and photographic work. Complete cost records are being kept and will be published at the end of the season.

This is the first use of seaplanes in Canada for other than war purposes, the first flight of any kind ever made from Halifax to Quebec, and I think the first for commercial purposes ever made in Can-

FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, Care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, Care American Forestry Magazine, Washington, D. C. (1-3)

WANTED: Young forester, preferably married, for clearing and maintaining woodland on small estate, operating private nursery, etc. Will pay \$80 or better, depending on qualifications and experience. Six room residence on state road included. Address Box 750, c/o American Forestry Magazine, Washington, D. C. (7-9-19)

ada. The Managers of the various Companies which make up the St. Maurice Forest Protective Association have signified their intention to inspect their timber limits from the air, and photographic maps will be made for any timber holders in the Association who wish them.

A small station with living quarters and machine shop is to be prepared for the machines and the fullest possible use will be made of them.

VALUE OF NUTS

Nuts can and do take the place of meat in the diet with beneficial results, and with the growing scarcity of meat due to the world war, they are bound to be in great demand at good prices in the future.

The comparative food value to the pound in calories is shown by the following table:

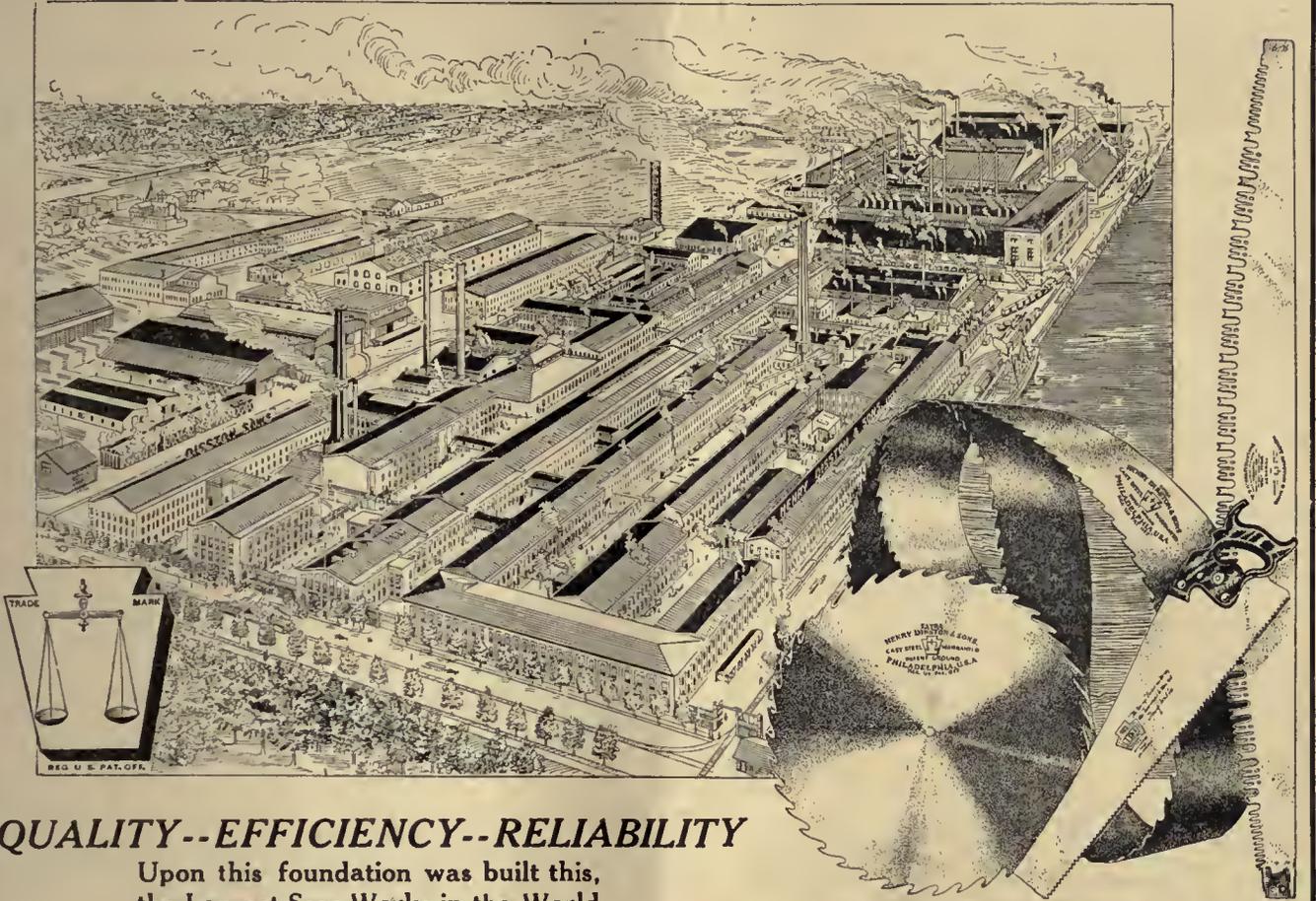
| | |
|-----------------|-------|
| Round Steak | 950 |
| Wheat Flour | 1,650 |
| White Bread | 1,215 |
| Dried Beans | 1,605 |
| Raisins | 1,605 |
| English Walnuts | 3,075 |
| Pecans | 3,445 |

It should be noted here that the true value of any article of food should not be measured by its cost, but by what it is worth to the consumer.

ONE POPLAR BRINGS \$11,000

A yellow poplar tree of giant size, which for years had stood in the hills of the Cumberland Mountain, where it was an object of unusual interest, has already brought approximately \$11,000 as a manufactured product. The tree was cut down by a local lumber concern and consigned to a firm in Cincinnati. When sawn, the product totaled nearly 7,000 feet of first-class lumber, with several hundred feet second-class lumber thrown in.

It is declared that this was the largest tree marketed from the eastern Kentucky fields within a half century. It was so large that for a number of years the task of marketing it was a serious obstacle, there being few lumbermen who cared to try to cut it down.



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HELP TO REFOREST FRANCE

THE AMERICAN FORESTRY ASSOCIATION has undertaken the great task of helping to reforest the shell-torn, war-shattered areas of France; and to aid also Great Britain, half of whose forests were felled; Belgium, whose forests suffered terribly, and Italy.

The great humanitarian need, the prime economic importance, the broad constructive value of this work—all place it on a plane which gives it striking pre-eminence. Therefore, it is felt that every member of the American Forestry Association will desire to have a part, and as big a part as possible, in carrying out this program.

BY those who are competent to judge, it is asserted that the forests of France kept the Germans from Paris. How great a debt, then, does the world owe to them!

AMERICA can build no nobler memorial in Europe than by replacing the devastated forests of France, Great Britain, Belgium and Italy. ¶Answer this appeal at once by sending your check for whatever amount you can afford, to the American Forestry Association. It will help to purchase the seed needed to replant the forests of our Allies.

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WASHINGTON, D. C.

BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

| | |
|--|--------|
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* This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.

TREES OF INDIANA

A new book of 300 pages on "The Trees of Indiana" has just been issued by the Department of Conservation of the State of Indiana. It contains a scientific description and a full-page illustration of each of the native trees of Indiana. The qualities and uses of the wood are given and the value of each species for shade and for forest planting is discussed. This is a book that should be in the hands of every wood lot owner and of everyone

who is interested in our native trees. It is especially recommended for teachers. It will enable them to teach their pupils to know our native trees. Any teacher can have as many copies as he can use to advantage in his school work. This book is free for the asking, but since the supply is limited, if a copy is desired application should be made at once. Send your order to the Department of Conservation, office of the State Forester, Indianapolis, Indiana.

BOOK REVIEWS

The Forest Ranger, by John D. Guthrie. Richard G. Badger, the Gorham Press, Boston, Mass. Price, \$1.50. This is a book of verses, collected and edited by John Guthrie, which he has been getting together for the past fifteen years. Many of them appeared originally in the pages of forest news letters issued on the different National Forests. Poetical or literary merit is claimed only for a few but they surely reflect the daily life and work of the Forest Ranger in the wide and beautiful forest lands of the West. Some are frankly parodies, some rhymes and jingles and a few are songs most familiar to the ranger and hummed around his lonely camp fire on the trail. The desire of the editor to bring together and put on record a true expression of the spirit of these men who have heard the "call of the forest and of the distant places" is well met by the little volume. The book is prefaced by a characteristic letter from Gifford Pinchot, in which he says to the editor: "In collecting these verses, you have put me, with every other Forest Service man, deeply in your debt." Mr. Guthrie's work was a labor of love and we predict for it a warm welcome, worthy of the spirit of its preparation.

Practical Tree Repair, by Elbert Peets, 259 pp., il., \$2.00. Robt. N. McBride & Company, New York.

No science is more firmly founded on known facts and methods than that of tree repair and the prevention of tree diseases. The author of this intensely practical book gives clearly and concisely complete instruction covering the treatment of wounds, rot-fungi, boring insects, filling of cavities, bracing, materials used in filling, treatment of cavities without filling, etc. Illustrated from photographs and diagrams, this book is useful alike to the owner of a home and to the man who intends to take up tree repair work.

Identification of the Economic Woods of the United States, by S. J. Record, \$1.75. Revised and enlarged second edition, John Wiley & Sons, Inc., New York.

The main differences between this edition and the first (1912) are as follows: (1) The Key has been entirely rewritten and rearranged, several new woods are included and more of the common names are given; (2) the lists of references and the general bibliography have been brought up to date; (3) an Appendix has been added which amplifies some of the subject matter of Part I, and also includes considerable new data on wood structure.

In grouping the woods in the Key more attention has been given to their general similarity than to special features, thus bringing together for effective contrast the kinds which are most likely to be confused in practice. Attempt has been made to

have all of the descriptions comparable and, so far as permissible to make the gross characters the basis for separation. The microscopic features are printed in smaller type than the others, to avoid confusion and to simplify the use of the Key.

It is comparatively easy to make a key for a given lot of wood specimens, but to take into account the range of variation of each wood is an extremely difficult task. Such a key must be the result of growth, of the accumulation of years of investigation and experience, and must always be subject to revision as new data and new material become available. To this end the author enlists the co-operation of all readers of this magazine.

Vacation Days in Colorado's National Forests. Issued by the Office of the District Forester, District 2, this recreation booklet is guaranteed to create a longing in the heart of every reader for "the hills, whence cometh our help." And nowhere in our wide and beautiful country is this desire more fully met than in the "Switzerland of America." The National Forests in Colorado hold an opportunity, and an invitation to those to whom the impulse comes to leave the heat of the city and business cares behind and follow the open road to the "still places." Nowhere else in the United States, and seldom in any land, may one look upon more majestic vistas of snow-capped mountain ranges, forested slopes, granite gorges, tumbling cascades and rolling plains than in these playgrounds of the people in Colorado. The climate is wonderful—a tonic of sunshine and pure air, filling one with vigor. Few places may be found which offer the seeker after rest, recreation and outdoor life so many opportunities for enjoyment. The booklet describes briefly the National Forests within the boundary of Colorado, stressing particularly points of interest and the privileges extended to prospective visitors and contains as well practical advice and information regarding camping outfits, personal equipment necessary, etc. Further information may be had by addressing District Forester, District 2, New Federal Building, Denver, Colorado.

ENTOMOLOGISTS of the United States Department of Agriculture who last fall began an examination of the cranberry bogs of Michigan, Wisconsin, and the Pacific Coast which have received shipments of cranberry vines from New England report that they find no evidence of gypsy-moth infestations from such shipments. It had been feared that the moth had been carried on the vines to the western bogs. Determination of the fact was necessary in order to know what control measures should be undertaken. In that connection the Department is making tests to determine both the resistance of cranberry vines to intensive fumigation and the strength of fumigation necessary to destroy the eggs of the gypsy moth.

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

The Laurentide Company, which was the pioneer in grinding hardwood for pulp in an experiment last fall, tried a further one this spring when seventy cords of mixed birch, beech and maple were barked in the drum barkers without any difficulty and ground into pulp. Owing to the irregularity of the four foot sticks barking with knife barkers was soon proved to be unsuccessful but the drum barkers removed the bark, if anything, a little more easily from the hardwood than from spruce, the only difficulty was the weight of the wood which is harder on the conveyors. Beginning in August the Company will begin to use hardwood continuously.

The meeting of the Woodlands Section of the Canadian Pulp and Paper Association took place on June 25 and 26. The first day was spent at the Berthier Nursery of the Provincial Government as the guests of Mr. Piche, Chief Forester. The Minister of Lands formally opened the air patrol and the seaplane arrived and left from Berthier for its first trip. The nursery was inspected and also the planting on drifting sands at Berthier and a fine stand of white pine which has been thinned and cared for for a number of years. There was also a general discussion of reforestation and slash disposal. The meeting on the next day was held at Grand Mere and Proulx where the nurseries and experimental plantations were inspected and where tractors were, shown at work and a kerosene brush burner and gasoline fire pump demonstrated. An out door woodsman's lunch was served. A representative of the U. S. Forest Service was present and a large number of representative pulp and paper and lumbermen were present with a number of Government and private Canadian foresters.

Two trees affected with blister rust have been found in a plantation of Scotch pine planted by the Laurentide Company and have been removed and burned. The white pine weevil has also attacked the same plantation and a fungous disease which has destroyed some of the terminal buds. This latter is now over. If Scotch pine is going to suffer in this way it will hardly pay to plant it in this section.

Mr. H. G. Schanche, for many years with the Forestry Division of the Laurentide Company has become forester for the Abitibi Pulp and Paper Company, Ltd., of Iriquois Falls. They expect to start a nursery at once and begin reforestation on their cut-over lands.



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In the St. Maurice Valley two large fires have been extinguished without loss of merchantable timber but with a large area of cut-over land destroyed. In the earlier days when the areas of timber cut over each year by the various operators were small and widely separated the danger from the heaped up debris was not serious. Today, however, when an area of 126 square miles is being cut each year and when the operations of some of the companies are contiguous, a dry spell of eight or ten days and a high wind make such areas almost impossible to control and a terrible conflagration will be almost inevitable. The large number of men required to fight such fires makes them very expensive. The time has come when some Province-wide system of burning slash from lumbering must be inaugurated. Even if the cost should run to a dollar a cord, by being borne equally by all no hardship would be incurred and the cost would

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Think of all the rare floral gems that tint the landscape and keep the atmosphere full of fragrance; there are many that are out of the ordinary, but these six are distinctly unusual and showy. The entire collection for \$5.00 (purchased singly, \$7.00).

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be borne by the consumers at large who are the real owners of the forests and who are most interested in their protection. Individual timber holders can cut off their timber, make a profit and go out of business, but the public cannot see their forests vanish. Wood we must have and the forests must be handled so as to perpetuate them.

The Province of Nova Scotia has decided to employ a Provincial Forester and thus complete the proper policy for the whole of the forested provinces of the Dominion.

The work of the Dominion Forestry Branch at the Petawawa Forest Reserve, under Mr. H. C. Wallin, in studying the growth, increment and so forth of the trees there will continue during the summer. Some valuable results were obtained last year and much is hoped for the research program now under way.

The Commission of Conservation in cooperation with the Laurentide Company, the Riordon Company, the Abitibi Company, the Province of New Brunswick and the Province of Quebec, will continue their research work under Dr. Howe into the growth, reproduction, mortality rate, etc., on cut-over pulpwood lands. The work will also be extended to burnt over country. Plots have been laid out and treated in various ways. For instance, one plot has been cut clean and the debris burned in piles, another cut-over and the debris allowed to lie and the hardwood trees have been girdled. On others every seedling is

tagged and numbered and the growth will be studied. An entomologist and an expert in fungous diseases are with the party and will look after their respective fields. At the Laurentide Company plantations of various trees on different soils and with different aspects have been made, also different mixtures of trees and mixtures of dominant and suppressed trees from the transplant beds. These will be measured and studied from year to year. Seed selection is also being practiced and Scotch pine of the second generation is already growing.

A DEPARTMENT OF FOREST RECREATION ESTABLISHED AT THE NEW YORK STATE COLLEGE OF FORESTRY

A NEW department, that of forest recreation, has just been established at the New York State College of Forestry. This department will assist in the development of the work of the College, both along investigational and instructional lines, in the proper uses of forest areas for public recreation purposes. The establishment of this department is in line with the endeavor of the College to make its work of real service to the people of the State and to increase the right use of forests and forest lands. This is the first department of forest recreation to be established in a school or college in this country.

With the great Adirondack and Catskill Forest Preserves, Palisades Interstate Park, Letchworth Park and some thirty other public forest reservations, the whole totaling nearly two million acres, New York State has unique forest resources, capable of securing to its millions of people great public good in the way of recreational uses. Just as playgrounds are being established in villages and cities throughout the country, where play may be organized and properly directed, so the forests of this and other States must be studied and developed, that they may be more effective playgrounds for the people of the State.

This new department of forest recreation in the College of Forestry will be in charge of Prof. Henry R. Francis, who has made a specialty of this line of work and who during the past five years has been carrying on landscape extension work both in New York and Massachusetts. During the coming summer Professor Francis will begin systematic studies of forest and park areas in New York to prepare bulletins for recreational development, and late in the season will make a trip through the national forests and national parks of the West to see what has already been done by the National Government and by the Western States in developing the recreational possibilities of forest lands.

PROTECT LOCUST TREES FROM BORERS

PLANTATIONS of the locust tree can be successfully protected from the borer and grown profitably on a commercial scale if the trees are planted in thick stands or mixed with other trees, so as to produce a densely shaded condition during the first ten to fifteen years. Investigations of the United States Department of Agriculture showed that more trees were destroyed by borers in tracts which had been pruned occasionally, or closely grazed, or in which fire had killed out the underbrush, thus destroying the natural shade produced by weeds and shrubbery.

The denser the underbrush about the trunks of the trees the less is the damage done by borers. Trees growing from two to three feet apart were seldom injured, while nearby isolated trees were riddled by borers.

Condition Necessary for Borer Attack

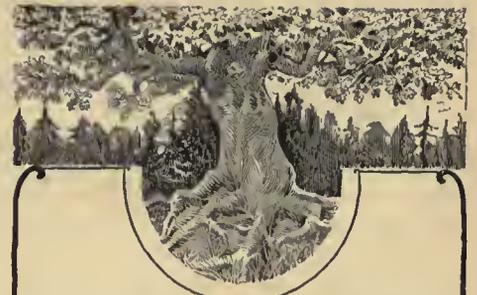
All trees and all parts of the tree are not subject in the same degree to attack by the borer. Rough bark provides crevices in which the borers deposit their eggs. Young trees, less than one and one-half to two inches at the base, are not attacked unless the bark is rough. On younger trees the borers are found at the base and near rough crotches. Trees with trunks more than five or six inches in diameter rarely contain the insects. On such trees the larger branches frequently are infested, but, such injury is seldom common enough to do much harm. Protection from borers is necessary for only a comparatively short period during the tree's growth. Under good growing conditions this time should not exceed ten years.

Treatment of Shade Trees

The locust is widely planted for ornamental and shade purposes. It is highly desirable, because it grows readily in a variety of soils and situations. It grows rapidly and forms a shapely crown when planted in the open. But it is frequently attacked by borers. This is because shade trees are planted singly and in the open, thus furnishing favorable conditions for attack.

Young borers can be killed readily by the use of an arsenical spray. Spraying will be necessary only every two or three years, unless badly infested trees nearby are not treated. As a rule, spraying will not be needed after trees reach six inches in diameter. Trees of that size are usually immune from attack, but should be watched.

Locusts make such desirable shade trees that they should not be neglected and allowed to become injured or destroyed by borers. The increasing value of black or yellow locust for many purposes makes it a profitable tree to grow commercially and emphasizes the importance of protecting it from the borer. Information concerning the care of both shade trees and commercial plantings of locust is included in Bulletin 787, issued by the United States Department of Agriculture, Washington, D. C.



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AIRPLANE PATROL IN NATIONAL FORESTS

PATROL of national forests by Army airplanes to give early warning of fires developing in the forests began June 1, according to arrangements completed with the War Department by the Forest Service, United States Department of Agriculture. On the same day observations covering a large part of the Angeles National Forest were begun from a captive balloon stationed over the Army Balloon School near Arcadia, California.

Two routes of airplane patrol work will be operated from March Field, twelve miles southeast of Riverside, California. Two planes will be used on each route, the routes will each be approximately 100 miles long and each route will be covered twice a day.

This is the beginning of experimental work in which the adaptability of aircraft to forest patrol work is to be thoroughly tried out. If the tests prove successful it is expected that the airplane patrols will be extended before the end of the 1919 season, and that airplanes will become a permanent feature of the ceaseless battle against fires in the national forests.

The airplane routes from March Field will afford an opportunity to survey about 2,000 square miles in the Angeles and Cleveland National Forests. The airplanes are not equipped with wireless telephone apparatus of such a nature that they can communicate with the ground without the installation of expensive ground instruments. Warnings of fires will be transmitted by means of parachute messages dropped over a town, the finder to telephone them to the Forest Service; by special landings made to report by telephone, and by returning to the base and reporting from March Field direct to the forest supervisor. Fires will be located and reported by squares drawn on duplicate maps, one to be in the possession of each airplane observer and another to be in the office of the forest supervisor.

The observation balloon over the Arcadia Field is to be maintained at an elevation of about 3,000 feet from 7 A. M. until 2.30 P. M. each day. The student detachment learning observation now stationed at Mount Wilson will also render fire lookout service. Reports of fires from both the balloon observer and the Mount Wilson detachment will be telephoned to the Army Balloon School and transmitted to the Forest Service office at Los Angeles. A fire-fighting truck, with ten enlisted men, will be stationed at Arcadia as part of the fire-suppression forces and will be subject to the call of the Forest Service.

IN MANY sections of the national forests it has been found impossible, without great expense, to maintain telephone wires or cables because of the havoc wrought by timber falling across the wires and by heavy snowslides. Therefore, wireless tele-

phones are soon to be given a trial in the forests, and the Signal Corps of the Army has lent four combination sets of transmitting and receiving apparatus to the Forest Service of the United States Department of Agriculture.

Equipment is to be installed on Mount Hood, at an elevation of about 13,000 feet, and another set is to be at the nearest forest ranger station, about twelve miles away. Two other sets are to be placed in the Clearwater forest region of Idaho, which is heavy wilderness country.

Wireless telephones have never been tried in mountainous country, and interest centers in the results of the experiments, particularly in the effect on messages of high ridges between telephone stations. The Mount Hood experiment will show the practicability of talking from a high point to a low point, and the Clearwater forest experiment will demonstrate whether messages can be communicated from two points of about the same elevation but separated by mountains.

All the wireless stations will be established at lookout points, and will give warnings of fires developing in the forests, supplementing the regular facilities of the Forest Service.

A CREW of treeplanters at Albuquerque, New Mexico, is now working under the direction of the Forest Service planting Douglas fir and Engelmann spruce on the high, barren slopes of Santa Fe Baldy, in the Sangre de Cristo range, on the Santa Fe National Forest. A large number of trees were planted last year, and 40,000 more are now being planted.

These seedling trees were grown from the seed of native forest trees at the Gallinas forest nursery, where experiments have been conducted for several years by the Forest Service in the art of growing forest trees from seeds. The problem is a very difficult one, according to forest officials, owing to the many technical questions involved in the semi-domestication of wild tree species. These problems have now been solved, and the forest plantation on Santa Fe Baldy, as well as several other plantations in the region, have been successful, and conclusively prove that forest trees can be artificially grown in the southwest in spite of adverse climatic conditions.

After getting a three years' growth in the Gallinas nursery, forty thousand of the seedlings were transported on pack-horses, with great difficulty, nearly to the summit of Baldy early this spring, where they were buried in the snow until weather conditions became favorable for planting. With the unusually moist, cool season, forest officers are very hopeful that a large percentage of the seedlings will survive and grow into a heavy stand of valuable timber in the course of the next two centuries.

The work of growing the seedlings and starting the plantation has been carried out by Forest Examiner Herman Krauch.

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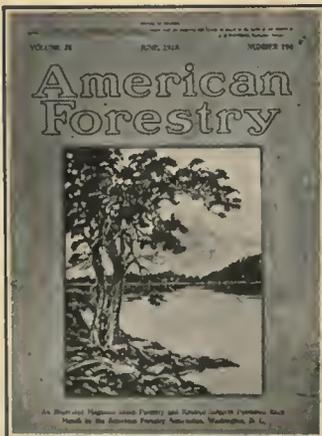
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THIS SCENE NEAR BOESINGHE, BELGIUM, INDICATES HOW THE GERMANS USED VAST QUANTITIES OF BELGIAN TIMBER IN BUILDING ROADS ON LOW GROUND. THE TREES STILL STANDING ARE DEAD, SHATTERED BY SHELL AND GUN FIRE.



THE CONDITION OF THE PARK OF A CHATEAU NEAR MERCKEN, BELGIUM, AFTER EXTENSIVE TIMBER CUTTING BY THE GERMANS AND SOME SHELLFIRE. NOTHING LIVING IS LEFT STANDING.

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BELGIUM'S FORESTS BLIGHTED BY THE HUN

BY PERCIVAL SHELDON RIDSDALE

EDITOR OF AMERICAN FORESTRY MAGAZINE

BRUSSELS, BELGIUM.

THE Germans practically destroyed the forests of Belgium during their four years' occupation of the conquered territory. A few small areas of wooded land still remain, but the trees are standing only because the Germans in their hurried retreat followed by their speedy acceptance of the armistice found insufficient time in which to complete their work of destruction.

Several hundred million dollars' worth of trees were destroyed, and the four provinces of Hainaut, Liege, Luxemburg and Namur suffered most severely.

Protests against the wholesale destruction of standing timber, and the deliberate damage of young growth so that it could not survive were made to General Baron von Bissing, Governor General of Belgium, by the Belgian Forest Administration and by the Central Forestry Society of Belgium, without avail, and the systematic and scientific destruction of the forests and woodlands continued during the entire period of the occupation.

Belgium's forest area, 1,299,450 acres constituted about 17% of the entire area of the country, whereas one-fourth of the German Empire and one-third of Saxony, Bavaria, Wurtemberg and Baden is in forest. As Belgium is without doubt one of the heaviest lumber consuming nations of the world, in view of the density of her population and the needs of her industries, these German forests will undoubtedly be compelled to restore the lumber Belgium has lost, but only the long years can restore her forests. Meanwhile, the effect of changes of climate due to loss of her forests may cause damage impossible to estimate, to add to the many injuries already sustained by this unhappy country.

The situation is well expressed by a report of the Central Forestry Association of Belgium, of which Count Visart de Bocarme, the heroic Mayor of Bruges, is president, which says: "In 1914 the wind of Liberty still blew in the rich foliage of our forests, which were, alas!

soon to become acquainted with the axe of the vandals. For, during that dark period of fifty-two months, after committing every manner of crime, they also perpetrated the monstrous felony of laying low our forests; for let us remember that they have cut down several hundred millions worth of our trees.

"Everything went—venerable shade trees of the roadside, the parks, and the fields, elms and poplars; experimental trees, exotic or curious; historical trees; forest trees such as oaks, ash, beech, or of the orchard, such as walnut trees; massive growths of both deciduous and indeciduous varieties; forests belonging to the nation, to communes, to charitable institutions, or to private individuals; nothing was spared, old or young, tall timber or coppice wood, not even the bedding.

"They had set out to leave nothing standing when they were finally compelled to let go under the irresistible pressure of our victorious troops, and in some cases left their cutting unfinished."

Much was done by the Belgians during the four years in the effort to save some of the forests, to have the young growth protected even if the usable trees had to be sacrificed. Notes,

protests, appeals, supplications, were made to the German officials, but all without other result than curt refusals to modify the orders for steady and systematic destruction which were being issued from time to time.

To General Baron von Bissing was pointed out the fact, so familiar to every German officer, that a certain area of forest is absolutely essential to the prosperity and even the vitality of a nation, a truth put into application with jealous care in the various states of Germany. He was told that in Belgium for the last twenty-five or thirty years, the nation, the provinces, the communes, and numerous owners have united their efforts with a view to increasing the forested area, which was obviously insufficient, in view of the imperative needs of the nation in the way of timber, as well as out of consideration for

Belgium, eager for the restoration of her destroyed forests, has gratefully accepted the offer of the American Forestry Association to aid by presenting American forest tree seed. Belgium's director of forests, N. I. Crahay, has asked for quantities of the following seed:

NOBLE FIR, GRAND FIR, WHITE FIR, SILVER FIR, WESTERN LARCH, DOUGLAS FIR, PORT ORFORD CEDAR, BALD CYPRESS, TIDELAND SPRUCE, PIN OAK, RED OAK, SUGAR MAPLE, SILVER MAPLE AND TULIP POPLAR.

The American Forestry Association is now soliciting contributions to a fund to provide this seed and also to provide seed for the replanting of the devastated forests of France.

the numerous and valuable indirect services which forests render from the standpoint of climate, water supply, etc.

It was also indicated that the forests were young and of recent creation, and their yield of lumber as well as their general output comparatively small, for the area of mere coppice wood and of timber of small value or utility constituted about one-fourth of the whole.

Numerous plantations had been established, some in order to protect regions against dominating or drying winds, others for the sake of clothing hills and elevated plateaus with a view to preventing disastrous overflows of water courses which prevailed prior to the establishment of these plantations. The removal of these woods which served as a defense against the elements would cause not only considerable losses but even a public

stipulations of the international convention signed at The Hague on October 18, 1907.

"As a matter of fact, as regards the Government forests, article 55 of this convention provides that the occupying Nation shall be considered only as an administrator and usufructuary of this property and shall be obliged to administer it in accordance with the rules on usufruct.

"Now, the exploitation of these forests is regulated according to the Belgian laws on the basis of methodical arrangements which determine the areas and amounts to be cut annually.

"As regards the forests of communes and of private parties, article 52 stipulates particularly that requisitions in kind shall be made against communes and inhabitants only for the needs of the army of occupation.



SUCH SCENES AS THIS IN BELGIAN FORESTS AND WOODLANDS ARE NOT UNUSUAL. THERE ARE SCORES AND SCORES LIKE THIS AND WORSE. THE DIFFICULTY OF THE PROBLEM OF RESTORATION IS APPARENT AT A GLANCE.

danger as a result of the probable inundations, not only in Belgium but even in Holland, if, for instance, the hills of the basin of the Meuse and its affluents were stripped. It would certainly provoke legitimate protests on the part of the injured owners, who would find their crops reduced in consequence of the absence of the shelters which protected them, or ravaged by the torrents which would be sure to arise following the denudation of the hillsides.

The Forestry Society even pointed out that the stipulations of the international convention signed at The Hague protected the forests of occupied enemy territory, and said in an appeal to Von Bissing:

"We are compelled to protest against the seizure of our forests, all the more energetically because we consider ourselves protected in this highly grave matter by the

"Now, it does not seem to us possible that the army of occupation alone could use the large quantities of wild pine, spruce, beech, oak, and walnut that have been cut down, taken out, and seized by the German military authority.

"The same article also stipulates that these requisitions shall be in proportion to the resources of the country and of such a nature as not to impose upon the population the obligation of taking part in the operations of the war against their own country.

"Now, according to the considerations set forth above, we are convinced that the timber that is now being taken is out of all proportion to the extremely limited timber resources of Belgium, which are already exceeded by the needs of the natives."



A WOODLAND NEAR MERCKEN IN BELGIUM, SHOWING THE REMAINS OF WHAT WAS ONCE A ROAD RUNNING THROUGH THE MIDDLE OF THE PHOTOGRAPH. WOODLANDS IN THE DISTANCE WERE SAVED DOUBTLESS BECAUSE IT WAS TOO DIFFICULT TO GET OUT THE TIMBER.

The effect of this protest may readily be guessed. Von Bissing, in a brief note, replied that the explanations could not induce him to revoke or modify the measures taken, and added that the cuttings were on so small an area that "it is impossible for any of the injuries which you fear to occur." The Forestry Society comment on this was:

"Let us merely say that it is a wonder that its author did not say that not only have we no injury to fear but that these cuttings were ordered in the interests of our

people and of our forests." The Belgians, still brave, still hopeful, still deeply concerned, endeavored by submitting forceful statistics on the situation to Von Bissing to secure some modification of the campaign of destruction. This was sent him:

"We see there that the total area of *indéciduous* forest in the kingdom is 424,150 acres, divided into 138,685 acres under the forestry administration and 285,465 acres belonging to private parties.

"The sale price of the exhaustive cuttings in the inde-



LE BOIS DES LUPINS, NEAR BOESINGHE, BELGIUM, SHOWING THE EFFECT OF HEAVY SHELLFIRE ON THE GROUND AND ON THE TREES. SUCH DAMAGE EXISTS FOR A WIDE AREA IN THIS SECTION.



THE PARK OF A BELGIAN ESTATE OCCUPIED BY THE GERMANS. HERE TIMBER WAS CUT AND PRACTICALLY ALL OF THE UNCUT TREES WERE KILLED BY FIRE AND SHELLS. MANY OF THE FINE PARK LANDS OF BELGIUM ARE IN A SIMILAR CONDITION.

ciduous forests under the forestry administration having been 577,419 francs in 1910, we can infer from this that, for the total area of indeciduous forests, the proceeds of the exhaustive cuttings amounted in 1910 to approximately 1,765,165 francs, representing a total volume of 126,083 cubic meters.

"According to the same data we find that in 1910, in regard to the provinces of Hainaut, Liege, Luxemburg, and Namur, as referred to in Your Excellency's answer, the area of indeciduous forests is 204,158 acres, the proceeds from exhaustive cuttings 859,615 francs, and the volume exploited 61,401 square meters.

"The revenues of the preceding years are practically the same as those of 1910, and may be considered as normal and as representing the maximum yield.

"Now, Your Excellency writes us that, according to anticipations, the cuttings of indeciduous timber will not exceed an area of 4,940 acres in these four provinces.

"This area will be taken from the growths offering the heaviest dimensions and representing a present value of 12,500,000 francs at the least.

"This quantity therefore considerably exceeds not only the maximum yield of the four provinces contemplated, of which we did not even deduct the forests comprised in the line-of-communications zone, but it also exceeds that of the whole country.

"Under these circumstances, and inasmuch as it has already been necessary, for the needs of the Nation under present conditions, to dig deeply for the last two years into our forest reserve by means of extraordinary cuttings, it is to be foreseen that, through the fellings con-

templated, the resinous lumber resources of Belgium will be reduced beyond all proportion, if indeed they are not exhausted completely for the years to follow."

To this Von Bissing, evidently short of arguments and without doubt somewhat peeved, said he was familiar with the statistics and "I cannot deduce therefrom any reason for suspending or modifying my instructions."

There was nothing further to be done. The cutting of usable trees and the destruction of the young growth continued.

The damage done to the various forests is indicated in the following reports of the Forestry Society now available:

"The operations of the occupying nation had begun—one must break one's hand in in all things—by cutting down the resinous trees. As early as July 7, 1916, we were informed of the seizure of the resinous forests belonging notably to the communes of Chimay and Forges, to Mr. F. Brugmann in the territory of Escaillere and of the Riezes, and to Mr. Ch. Malengreau in the commune of Macquenoise.

"The exploitation of the spruces on the Revers d'Oise and in Fagne, the two cantons belonging to the city of Chimay, and that of the wild pines, in the commune of Forges, was carried out quickly; the case was the same with wild pines about sixty years old, planted as tall sentinels at the entrance of the oak groves of the commune of Salles and in regard to which they already dispensed with the formality of sending a notice of seizure. This latter cutting was exploited at the end of September, 1916; it was the same way with some spruces which the

communes of Seloignes and Forges-Philippe owned on one of the heights of their forests of Thierarche.

"It took more time to fell the splendid mass of spruces of the Hauts-Marais. This forest was assuredly the most beautiful of this kind that existed in Belgium, great spruces planted about 1862 and whose spires seemed to reach the sky in the darkness which their thick branches left on the ground. This beautiful mass no longer exists; all the spruces, and with them large quantities of trees which grew in the forest proper, along walks and borders, all have disappeared for the satisfaction of the needs of the occupier, who never cared, of course, to indemnify the owner. What is more, for we can never get done telling the misdeeds of the Germans in Belgium, groups of exotic trees such as Japanese larches, Douglas firs, etc., remarkable for their vigor and their dimensions, found no more mercy before the axe of the vandals than did the ordinary spruces.

"At the same time there were being exploited in Thierarche, on the territory of Macquenoise, pine woods mixed with birch. The Germans had constructed a Decauville railroad in order to transport the timber to the railroad station at Momignies. On this track was a wheezy locomotive pulling a car which contained at most one and one-half cubic meters of wood; and good people, good Belgians at that, were nevertheless admiring the spirit of organization of the usurpers!

"The quantity of oaks concentrated in the forests of the Chimay region and the situation of the forested areas with respect to the railroad stations adapted to the German enterprises, are likewise the reasons why the

Thierarche forests had to suffer worse than those of Fagne.

"In view of the stoppage of business the greater part of the communes had failed to sell the oaks of the cuttings of 1915 and following. On the contrary all the white wood, which is suited to the manufacture of wooden shoes—the only local industry that kept up during the war—all the white wood had been sold as soon as the exploitation of the copse had permitted operations of timber selection. This was in fact all timber saved from the break-up and turned over to Belgian industry for the consumption of the interior of the country, but it was necessary to be disillusioned soon on this point also with respect to the honesty of our adversaries.

"The high oak forests of Bourslers and Forges were attacked first; while the felling of communal forests took place in violation of all rights and conventions. We must recognize that here at least the frenzied desire to injure and destroy the forest, to wipe out the forest reserve and all resources for the future, this bad desire, we will say, does not appear. Only the larger trees fell, and enough others were preserved so that the forest still has the appearance of high timber over a thin copse. However, all the big oaks are felled; as a matter of fact, they constitute the bulk of the value.

"While matters did not transpire so badly for these two communes, it was different with others, whose misfortunes we shall recite.

"The forest of Monceau-Imbrechies, traversed from south to north by the road from Monceau to Seloignes, reached the facilities of the Seloignes-Monceau railroad



STURDY TREES IN A PARK IN BELGIUM WHICH SUSTAINED HEAVY SHELL AND MACHINE GUN FIRE AND STILL STAND, SKELETON DEAD, FILLED WITH BULLETS AND SHRAPNEL SCRAP.

station. It was one of the richest forests in the region, well served by two metaled roads, and situated between the railroad station and the locality which comprises many makers of wooden shoes, all being circumstances which gave value to the various classes of timber. Its big oaks, while not all of excellent quality, were known far and wide and offered dimensions little known elsewhere. One of these veterans measured $13\frac{3}{4}$ feet at a height of five feet, and was 53 feet high; it was named the Big Benefit Oak. Individuals from 6 feet to 8 feet in diameter were common there, those measuring from 8 feet to 11 feet were not rare, and there were several gauging 11 feet and over. Groups of beeches, modern and ancient, were met with and distinguished themselves by an exceedingly

"The forest of Imprechies, a section of the same commune, was cut to the ground, or almost; it was stocked with about the same growth as that of Monceau, though a little less rich in big trees.

"The commune of Beauwelz owned high timber on copse, less thickly planted than the Monceau forests. Of all the oaks, beeches, birches, and maples nothing is left over almost the whole area. The "Decauville" railroad, constructed for the transportation of the resinous timber of the private forest, seems to have helped to consummate the ruin of the forest; the trees were felled there in the copses of all ages, from six to eighteen years! The birches and other timber that could be used in manufacturing wooden shoes and for which the industry was



ALL THAT IS LEFT OF A BELGIAN WOOD OCCUPIED BY BRITISH TROOPS WHEN THIS PHOTOGRAPH WAS TAKEN AFTER THE ARMISTICE. IT IS THE BOIS TRIANGULAIRE, NEAR MERCKEN. ALL THE SKELETON TREES STANDING ARE DEAD. THE YOUNG GROWTH IS UTTERLY DESTROYED.

rapid growth. Tall birches and big sycamore maples completed this fine high-timber forest.

"To this forest were given the names of Tailles Andre, Benefice, Richots, Mauvais Pas, and Atelier; the cuttings dated from 1906 to 1917. Apart from the high timber, everything has disappeared: Secular oaks, groups of imposing beeches, tall birches, big maples, rooted saplings, staddles, moderns, ancients, superancients, young cadets, tall timber of young cuttings, reserves of middle age stature and old exploitations, everything was chopped down to within 20 inches of the ground, and dragged through copses of all ages to the roads by the pitiless cable actuated by a tractor. The copse is broken up, crushed, distorted, and destroyed.

paying at the time at the rate of 70 francs per actual cubic meter, were cut down at the same time as the oaks, being cut up into logs for use in heating the fire boxes of the tractors and locomotives.

"The Germans have ruined the commune of Beauwelz, and the indemnities the latter may be able to collect will not restore to it its forest wealth, which has hitherto been the uninterrupted source of its revenues, of wages for its woodsmen, and of raw materials for its makers of wooden shoes, all of which are factors of exchange and benefit to the whole locality.

"These two communes have been hit harder than the others. Beauwelz was able some twenty years ago to escape inroads on its timber supply such as had been



CONDITION OF A WOODLAND NEAR MERCKEN, BELGIUM, SHOWING HOW THE DESTRUCTION OF TIMBER AND DAMAGE BY HEAVY SHELLFIRE HAS TURNED FINE WOODLAND NEAR A WATERWAY INTO A SWAMP.



ANOTHER VIEW OF WOODLAND DESTRUCTION NEAR MERCKEN, BELGIUM. NOTE THE SHATTERED TIMBER LYING IN AND NEAR THE SHELL HOLES. RESTORATION OF LAND AS BADLY DAMAGED AS THIS IS WILL BE A TEDIOUS AND COSTLY WORK.



THE BOIS CHARPENTIER NEAR BISCHOOOTE, IN BELGIUM, IS A SCENE OF UTTER DESOLATION. THE FOREST VALUE OF THE LAND HAS GONE AND IT IS A WATER-SOAKED, MUD-COVERED AREA MARKED BY NUMEROUS SHELL HOLES.

caused elsewhere by the assessment of the "usage duties" of the old principality of Chimay; as a matter of fact, it bought all the trees which were to be sold for the benefit of the Prince of Chimay. The commune of Monceau-Imbrechies was also reputed to have considerable savings. The Germans knew the smallest details of our affairs and we should not be at all surprised if they were aware of the financial situation of these two communes; they, who were fighting for justice (?), could it have been that they wanted their operations to bring about equi-

librium in the forest wealth of our communes of Thier-arche?" These reports do not cover the whole area of destroyed forests, facts about which are now being gathered and which will later be printed. A brief examination, however, of any of the destroyed forests indicates very clearly the truthfulness of the Belgian comment in summing up their losses: "Such is the work of the Germans, of professionals, for it appears that it was professional foresters who were charged with designing and directing these henceforth famous exploitations."



A SCENE IN THE BOIS DES LUPINS NEAR BOESINGHE, SHOWING THE GERMAN FORTIFICATIONS AND THE DESTRUCTION DONE TO TREES AND FORTIFICATIONS BY SHELL FIRE.

THE NORTHWEST'S WORST FOREST FIRES

AS this issue of American Forestry goes to press, the reports regarding the forest fires now raging in the Northwest show a situation of extreme gravity. The conditions are probably the worst ever faced in that region. The third and worst of three successive years of severe drouth has parched the country. High winds, heat, and electric storms, bringing lightning without rain, have heightened the peril. There are probably more fires burning uncontrolled at the moment of writing than have ever been known since organized protection of the forests began. Twenty-five hundred men are on the fire lines in the National Forests, and the entire available surplus of labor in Northern Idaho and Western Montana has been gathered up by the Forest Service, and is not enough.

The worst fire year of recorded history, from the standpoint of losses, in the same region was that of 1910. The great conflagration of that year began after the middle of August. Normally, conditions grow worse and worse until early September brings the beginning of the fall rains.

What may come this year no man can tell. If an appalling disaster is escaped, it will be due in part to good fortune. At the best, there will be very heavy losses of property. The situation may any day reach a point at which the organized forces which are trying to hold the fires in check will be routed and put to flight before a vast and resistless, hurricane-driven sheet of flame. The Forest Service admits that already, though straining every nerve, it is having to give ground before some of the fires, seeking not their control but merely to limit, in so far as possible, their destructiveness by directing their course where they will do least harm.

To know accurately what is taking place in a battle is proverbially difficult until the smoke clears away. With great forest fires a similar situation is created. It is unfortunate, but inevitable, that just now when spectacular losses are again directing public attention to the great need of better protection against these fires, it is impossible to make out fully why the efforts to control them have not been more successful. That can only be told when all the details can be studied and analyzed. Nevertheless, certain undeniable facts stand out.

In 1910 the same region was swept by fires so widespread and devastating that it was hoped their record would stand unique for all time. The Forest Service met the situation heroically. Confronted with conditions the like of which it had never faced before, it won universal commendation for the fight which it put up against great odds. In the light of the experience then gained it developed new methods and improved its organization. It also sought from Congress larger authority to incur expenses in future emergencies of the same nature.

The next year Congress provided an extraordinary emergency fund of \$1,000,000. As the immediately following years happened to be exceptionally favorable

this fund was cut, over the protest of the Forest Service, to \$200,000 for the fiscal years 1913 and 1914, and to \$100,000 for 1915, after which it was eliminated entirely.

Again and again the Forest Service has been embarrassed by delays in the enactment of the agricultural appropriation act until after the beginning of the fiscal year on July 1. In 1912 the bill became law August 10; in 1916, August 11; in 1918, October 1. In each of these years a "continuing resolution" made available in the interim at the rate of one-twelfth the previous year's appropriation each month. Since the heaviest expenditures of the Forest Service and the fire season fall in the summer months, the method is obviously inadequate. Through what shifts and devices the fire fighters have been employed, transported, equipped and fed this year because of delay can only be surmised, but very serious responsibilities must have been assumed and formidable embarrassments surmounted. The remedy is simple. Let Congress re-enact the million-dollar extraordinary emergency provision and make the fund available until the next year's appropriations can be drawn on. What is not needed will not be spent, but will revert to the Treasury. Public opinion should demand that this appropriation be made.

It is also plain that the fund for co-operation with the States in forest fire protection should be largely augmented. The total is now \$100,000, apportioned among 24 States. Montana's allotment from this fund for the current year is \$3,000 and Idaho's \$4,500. The figures speak for themselves.

Further, it is imperative that radical measures be adopted to provide adequate salaries for Forest officers commensurate with the character of their responsibilities and with what private business enterprises are glad to pay the same men. The Forest Service is being starved out. Many men have left because they could not stand the economic pressure. In consequence green men have had to be put in where experience was of great importance. Repeated efforts of the Forester to secure more adequate pay for his field force have been without avail.

Finally, a more vigorous and determined public demand that forest fires throughout the country must be done away with, as nearly as this is humanly possible, must arise and find effective expression. Forest fires have become an anachronism. They belong to a heedless and unenlightened age in the matter of forest conservation. They must be fought on a nation-wide scale by private owners, the States and the Federal Government in co-operation. Protection of forests, including young growth, against fires must be made compulsory in all forest regions. Efficient methods must be developed under public leadership. Competent men must be employed by the States and the nation, and politics must not be allowed to make their work ineffective. The time for indifference and neglect is past. If our lawmakers fail to recognize the fact they may have cause to regret it.

PREVENTION OF FOREST FIRE LOSSES

BY SMITH RILEY

IT is well known the world over that America of all nations is careless with fire and although her equipment for suppression is of the finest, our yearly losses from fire are enormous when compared with other nations. The explanation of this would seem to be a lack of thoroughness in adopting and practicing methods of fire prevention. Does this failure come from the typical American haste in doing all things? Is it that in our construction work we are in such haste to arrive at completion we cannot take proper precautions to prevent loss from fire? Or is it that the ease with which property is gained and insured makes one careless whether it is destroyed by fire or some other way?

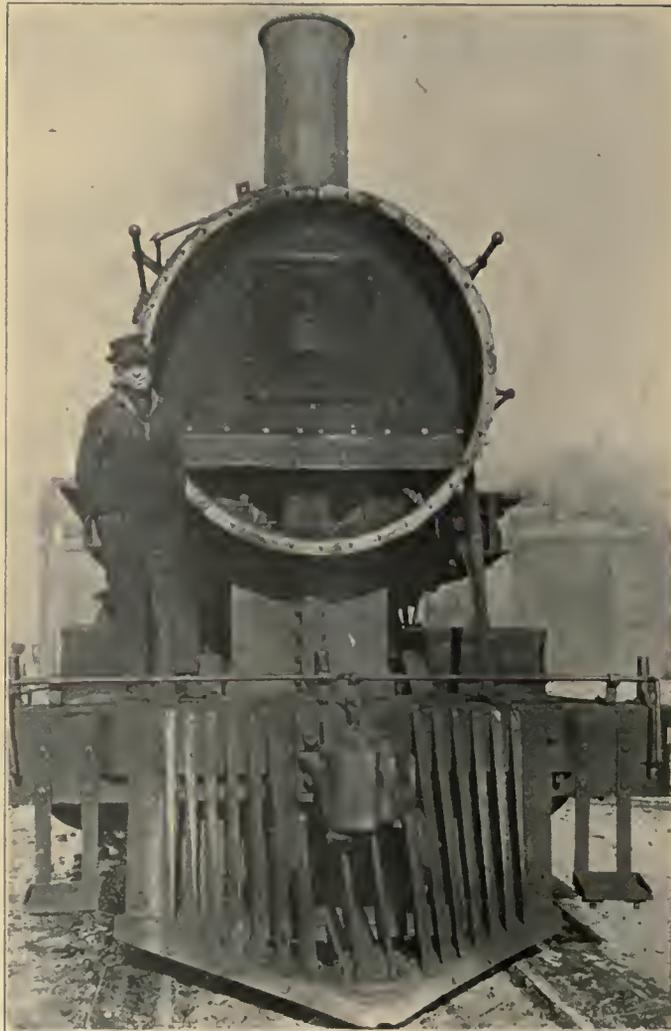
It is interesting to follow this line of thought in relation to forest fires doing enormous damage each year. These fires are from two causes, namely: Those started by man, and those started by lightning. A campaign of prevention should lessen and gradually eliminate a large part of loss from the first cause, while a policy of suppression must be applied to lightning caused fires. Lack of realization of the damage created by fire is certainly responsible for the greatest loss by man-made fires and it is quite interesting to note the gradual decrease in forest loss in those regions where progress has been made in educating the public to the necessity of care with fire to prevent such loss. The most effective way of doing this seems to be the forcible bringing home of the realization, by drastic measures, of the losses by fire and the need for cautious use of this element.

In New York State the action of the Conservation Commission in forcing the railroads to burn oil in engines running over all forest roads during the fire season has been a big step towards public realization

of the necessity for fire prevention. In South Dakota the most has been accomplished by a suit against a railroad that caused a big loss by forest fire.

Where the campaign for prevention has followed the principle of emphasizing the necessity of extreme care in any use of fire and the damage resulting to all forms of forest growth by its promiscuous use, much

greater progress has been made towards a realization of need for public care in its use. In Minnesota recognition is given to the policy of spring burning of logging slashes, which amounts to nothing more than setting out fire in such areas as soon as it will run in the spring and letting it burn. From a vantage point in the forested region one may count a dozen or more such fires when the season is on. There is no question that this promiscuous use of fire does much to deaden the realization of the damage done by fires and the public realization of the necessity of caution in fire use or the need of prompt action to stamp out fires gaining headway in dangerous seasons of the year. A public, understanding that fires are purposely set which destroy forest growth, is not going to be very keen in responding to a policy for putting out fires that may be burning this same type of forest growth. I feel sure the



AN EFFECTIVE MEASURE OF FIRE PREVENTION

This is a form of spark arrester which has been employed with good effect on locomotives in Colorado.

present losses and the lax attitude of the public toward this loss will continue in Minnesota wherever the present policy of spring burning is allowed to continue in a wholesale way.

There is, therefore, a much keener realization of need for caution where fire is not promiscuously used and I feel sure that the problems of protection against fire loss will grow less and be solved with much greater promptness where the burning over of forest land is considered detrimental to the highest degree unless



AND THIS DESTRUCTION MIGHT HAVE BEEN AVOIDED

This shows one of the many fires in the Black Hills Forest of South Dakota started by locomotive sparks before the employment of oil burning engines on all lines running through the forest.

complete control is demonstrated as necessary and put into effect when such burning is done.

While much remains to be done, what has so far been accomplished in gaining public recognition of the proper weight to be given fire losses is very gratifying. Railroad companies are realizing the necessity of placing a value upon all trees from the largest to the smallest. A fire was recently reported near a railroad right of way. The railroad company's claim agents were sent to the area at once with instructions to ascertain whether the company was responsible for the fire, and, if so, to appraise the damage and offer to settle. In a recent juvenile court case, two boys convicted of leaving a camp fire burning were sentenced by the judge to take a two weeks' trip into the forest to study a burned area and report fully to the judge the damage done.

The public when brought to a proper realization of the losses caused by fires and the need of care and prompt action for fire prevention and suppression, may become a fighting machine of the most effective kind. A fire starts; the individual who first sees it thereby acquires the responsibility of putting it out and, if this is not possible, of securing assistance promptly. Everything should be learned about the origin of the fire which is possible, so its cause may be fully understood. The man first upon the ground is in the best position to gain available information.

There is attractive excitement in answering the call to fight fire. A man who has answered this call once will always feel a quickening of the pulse and a desire to act when the call comes again. The need for quick action regardless of the hour, the necessity of matching one's wits against existing difficulties to secure imme-

diately action to control the element that is steadily destroying values it has taken years to create, brings a quickening of the pulse somewhat akin to that caused by a call for war. There is a big fire in one of the forests and an extra supply of equipment is needed. A wire has been sent to the district office for these things. The wire is received at 10.30 P. M. The next train upon which these things can be shipped leaves at 2.30 A. M. The first thing is to secure a conveyance and assistance, get into the supply room, pack the needed supplies, rush them to the station and express them out. Here is a piece of work that has in it only keen zest for matching one's wits against obstacles and not fail to fulfill the work of fire fighting

for which one has been made responsible by the receipt of the telegram. A man who has been a ranger for



CATCHING IT IN GOOD TIME

This shows Mexican section hands putting out a fire started by a railroad engine crossing the Pike National Forest.

many years said the one thing he regretted in leaving his position was losing the exhilarating excitement of going to and participating in controlling forest fires.

Efficient organization is important because every man who answers to the call for fire fighting, and is well treated, that is, well transported, well fed and bedded, will respond with zest to the work. Even a lazy man will feel a quickening of the pulse when he hears the call, like the dog and the child in the street when the fire engine goes dashing by. Prompt pay and good treatment are important factors that will in time make every man within striking distance a fire fighter to be depended upon. Here is a garage in a small mountain town crowded with people in summer. Many men are employed in this garage when the season is on and a line of cars is run, by the company owning it, through the forest to the nearest railroad point. The administration is charged with the

work of keeping fires out of the timber and the beauty of the forest growth along this road is of high value to the transportation company, so an agreement is entered into between the transportation company and the

forest administration providing that the drivers of all cars upon the road will keep their eyes open and report any fires noticed. When the report of an existing fire is received at the garage, fire tools furnished by the Government are loaded into a car and a number of men working in the garage are whirled away to the fire. The company is paid for the time of its men and cars. One who has seen the faces of these men on the road when they have been suddenly taken away from the mechanical work of the garage and speeded

into the open to fight fire, will understand the thrill of it. Efficient treatment must follow, else the men who respond will lose the zest of it. When the National Forests were first created there was no provision for



BURNED OVER AREA—THE ECHO RIVER FIRE

A public understanding that fires are purposely set which destroy forest growth is not going to be very keen in responding to appeals for fire protective measures and necessary control work, and must be educated to it.



HARD-WON REST FOR THE CREW

This shows the fighters at the Camp Creek Fire on day "sleep shift" near the burning fire line. Utterly exhausted, they roll up in their blankets and "tear it off."

paying except by check from Washington and those working upon a fire would have to wait a month or six weeks for their pay. It was not uncommon in those days, in calling a man to fight fire, to be told he would not go because it took too long to receive the pay. Here is different example: A bank cashier staying with some friends in the mountains, was asked by the forest ranger to help with a fire. He did so and worked at it all day. The check he received for his work was to him a souvenir of a novel and exciting experience. In the future, should this man be in reach of a forest fire alarm and be available, he will respond just for the excitement of it.

I have been told one loses his enthusiasm after fighting fire for a day or so; that the forest rangers in sections where the fire seasons are long and intense, become so wearied they dread to answer the telephone for fear the message may be of a fire requiring mammoth exertion. It is true that when

the body is weary, enthusiasm lags, but where the seed has been effectively planted, a period of rest will work a complete change as one's enthusiasm comes again to the front. Those rangers at the beginning of the fire

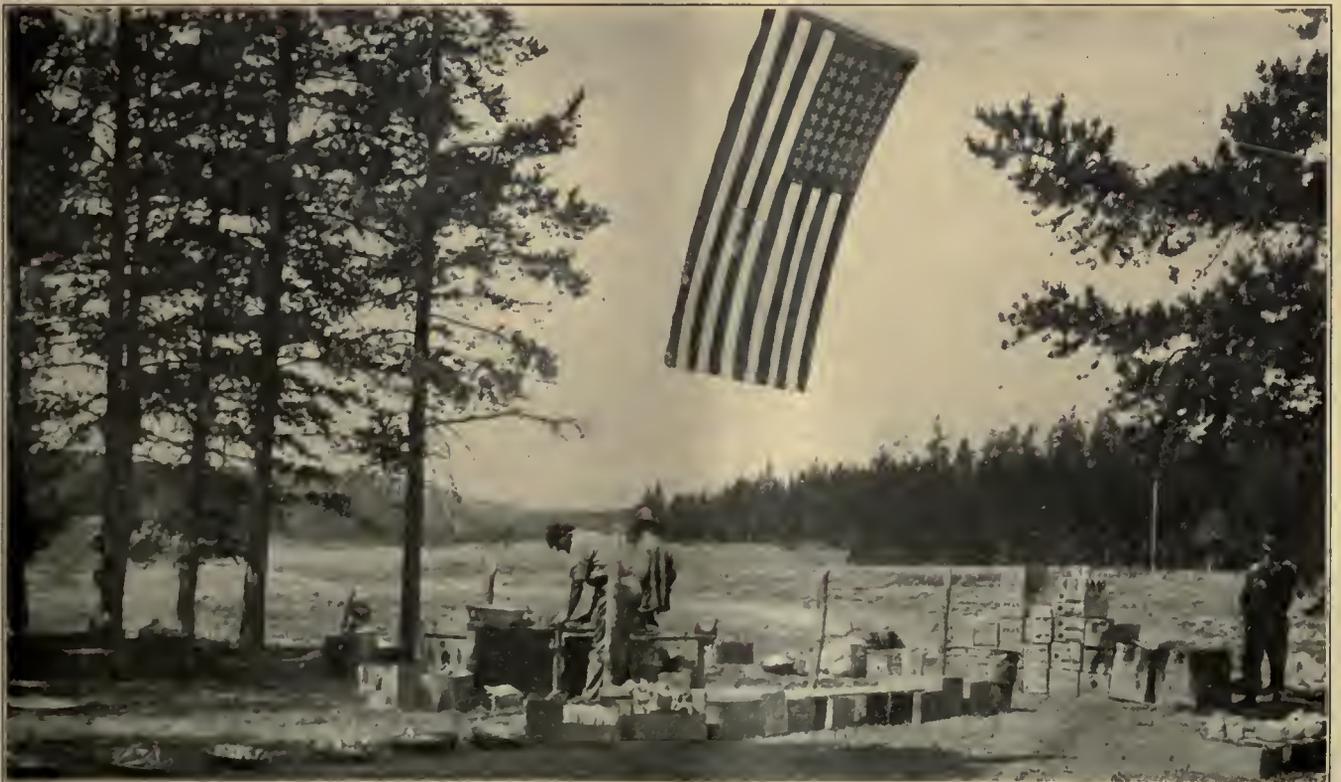
season are keen and enthusiastic. When they become weary by overexertion, give them a rest of a week or so and see what a change for the better will take place. This element of thrill is a real factor; it pays well to cultivate it in all classes of men. The response will come from those who delight in action and the attraction will be the zest of matching one's energies against an element of destruction beyond control. Efficiency in management,

such as good and prompt pay, transportation, good food and bedding, leaves the way clear to develop this enthusiasm, whereas poor management in any one of these things would tend to obstruct or lessen this enthusiasm.



WHEN THE GHOST WALKED

Here we see the forest officers paying off fire fighters at the termination of the work.



FOR THE COMFORT OF THE INNER MAN

This shows the thorough and methodical arrangement of the kitchen and commissary established near the fire line for the service of the men who are fighting the fire.

FOREST DESTRUCTION PREVENTED BY CONTROL OF SURFACE FIRES

BY JOSEPH A. KITTS

FOREST fires in the United States destroy, year by year, more than the forest yield. It requires at least 250 years for a forest to reproduce itself, *i. e.*, the yield is not greater than two-fifths of one per cent per annum. The stand of timber is being cut at the rate of $3\frac{1}{2}$ per cent per annum. It is evident that we must save the yield and augment natural reproduction by planting, in order to insure a future supply. The situation is now so critical that the fire problem is one to which earnest thought and attention should be given until a solution has been proven, accepted and put into practice throughout the United States.

Forest fires are of three types in effect—surface fires which spread over the surface of the forest floor, fed by the litter; ground fires which smolder in the ground, consuming the humus and sometimes the roots of trees; and crown fires which destroy the entire forest cover. Crown fires start from the ground and the litter must be very heavy and very dry and inflammable to cause and sustain them. The humus must be very dry to sustain a ground fire.

I have practiced for the past twenty-eight years, on my home lands in California, a method of prevention of crown fires learned from the Sierra Nevada Indians. I have found this method successful in my second growth timber and also in prime forest where the accumulation of litter (the cause of destructive fires) was in considerable proportion. This method has been highly satisfactory from every point of view and is here offered as a solution of the fire problem in the coniferous forests.

The method consists in the burning of the forest litter, by surface fire control as described herein, during and at the end of the wet season, burning over by rotation from one-fiftieth to one-fifth of the forest area each year, the periodical rotation depending upon the local rate of litter accumulation. The litter is then burned without danger from crown or ground fires and, if handled scientifically, aids natural reproduction, removes the excess underbrush, increases the forage, maintains the forest in a thrifty and healthy condition and renders the forest immune to destruction by fire at all seasons of the year.

It is well known that the Indians practiced a periodic burning over of the forests. Literature on the subject has explained this in many ways excepting the one here given. When the California pioneer asked the Indian why he set so many fires, he replied, "Letum go too long—get too hot—killum all." He used the surface fire to burn the litter in order to prevent the crown fire which destroyed everything. He may not have been very scientific but it must be admitted that his methods of preservation of the forests were highly successful when compared with present day destruction. The first

growth trees are fire-marked throughout the northern Sierra Nevada forests; the indications of destruction by crown fires prior to the coming of the "Americans" are in small proportion and so indistinct as to point to fires very remotely in the past, if at all; and, the ages of the prime trees precludes the occurrence of crown fires for hundreds and thousands of years of aboriginal treatment. The pioneers found these forests open and clean; today they are so encumbered with fallen trees, underbrush and other litter that complete destruction is the usual result of a summer fire.

Consider the fires in the Crater Lake National Forest in 1910. (Forest Service—Bulletin 100). This forest has an area of 1,166,600 acres, an estimated total stand of 10,197,000,000 feet B. M. and a rated annual yield of 90,000,000 feet B. M. 60,891 acres, or 1-19 of the total area, was burned over, destroying 250,000,000 feet B. M., or 1-40 of the stand of timber. One thousand men, employed in fighting the fires, were found inadequate and five companies of United States troops were added. The cost of fire fighting to the Forest Service was \$40,000, or 70 cents per acre for the area destroyed. One thousand acres of the burned-over area was reseeded at a cost of \$3.00 per acre. The loss, then, cannot be estimated at less than \$3.70 per acre. The timber destroyed was three times the annual growth, and, although the year 1910 was an unusually dry one, it must be remembered that the average annual destruction, throughout the United States, is greater than the rate of growth.

I recently had an opportunity to study the densely planted forests of France. It should be observed here that without these planted forests France could not have waged war for four years. Crown fires are unknown in these dense forests because the people gather the litter for fuel. It is not possible, of course, for us to go fagoting through our forests and we must dispose of the litter in some other manner.

We use the backfire to remove the litter in order to stop a crown fire, and under most adverse circumstances. When the crown fire reaches the area backfired the live trees alone will not sustain it and it is stopped. Even in the drouth of summer, the backfire does little or no harm to the live trees. When the backfire is used to stop a crown fire, it only limits the destruction; it may be used in the spring to prevent it. The backfire is a controlled surface fire working against the wind, which prevents it from becoming a crown fire.

The following rules for surface fire control may be safely used by any engineer or forester experienced in forest fire fighting:

1. Burn the forest litter, by means of surface fires, during and at the end of the wet season, in intervals of

(Continued on Page 1306)

UNCLE SAM, LUMBERMAN, CANAL ZONE

BY W. H. BABBITT

I DO not believe that it is very generally known that the United States Government is in the lumber business, actually operates a saw-mill, maintains lumber yards, sales department and all of the other establishments that go with the business. This is, nevertheless, a fact. The operation is on the Panama Canal Zone. The radical departure from the general policy of the Government is, I believe, likely to be of interest to American timbermen, and as the operations are being carried on in a new or little known field, the results obtained should also be of much interest. I hope my effort to impart these facts may not be too severely dealt with, if I also attempt to sketch in a little of the local color and a few of the human heart throbs, to lighten the otherwise heavy duty of the self-appointed historian.

The business is a child of the war and was brought into being to supplant, as far as possible, by use of native species, lumber imported from the States, and thereby release shipping for war purposes. One may wonder, if not conversant with the facts, why, when the canal is dug and duly operating, any great shipments of lumber were required. One look at the machine shops, dry docks, foundries, etc., necessary to the maintenance of locks, dredges, liters and tugs of the operative departments of the canal where ships are repaired, or even built complete, or at the extensive car shops, where the rolling stock for the Alaskan railroads is being made up from old canal equipment, together with orders for foreign service and for the States, should be sufficient to convince one that raw material in quantity is, and will be, constantly required.

Many millions of feet of lumber had to be cut to entirely supplant the shipments from the States. Could

it be done? Well possibly, yes. There was machinery and men enough, but what about the timber? When garnered together from near and far, the facts were by no means imposing. It was known that the local forest contained trees that could be cut into sawlogs. Some of these trees had even been sawed up on a little resaw rig

prior to the birth of the new industry and furniture woods such as coco bolo, nazareno, mahogany and Spanish cedar of the cigar box variety, had been logged from the Zone since the old French days, and there it ended, for while saw-mills are plentiful on both coasts of Central America, none of them have ever cut commercial lumber, nor been successful in selling what they have cut, and from the point of view of a practical lumberman, the field was, and is, an entirely new one.

The mill itself is not too imposing, a thirty-five foot band saw intended originally for resaw work in ship construction, on which the edging is also done, and a trimming and slab saw. The entire rig occupies a corner of the large planing shop, but it is gradually, like the camel of the fable, pushing the original machinery out into the open. Roll ways were built to receive the logs, since most of the timber was expected to be of floating hardwoods and a pond would not only be nearly useless, but would unduly excite the sanitary contingent, a power to be reckoned with on

the Zone. Please note that the first lesson to be learned by a newcomer, upon landing in the Isthmus, is to let sleeping dogs lie, for be it known that the ways of our Uncle Samuel are passing strange to the uninitiated.

Dry kilns were also built and so was a burner to take care of the slabs. A logging camp was established on Gatun Lake and those in charge of it had the double duty



SHOWING DETAIL OF THE PECULIAR BARK OF THE LIGNUM VITÆ

The wood is close-grained, heavy and very hard, and the tree, with its richly colored dark green leaves, its blue flowers and orange-red fruits, is in striking contrast to its arid surroundings.

of choosing the species to be cut from an endless variety of entirely unknown trees and of inducing the natives to contract for the cutting of the same, that having been found the most satisfactory way of handling the labor question in the tropics. Gatun Lake, along the shores of which the logging was to be done, is approximately twenty-five miles long by twelve in its greatest breadth and is a lake of a thousand arms and islands. It is an artificial body of water held by Gatun Dam eighty-five feet above the salt water level. It is a reservoir for lockage water and for hydro-electric power and is one link of the canal proper, frequently giving the woodsman the rather unusual spectacle of one of the world's largest ships quietly slipping along through the tall uncut forest.



AN AVENUE OF WEST INDIAN ALMOND TREES

The standing forest in the lake bed was only cleared from a few areas such as the canal channel and the anchorage basins, and the rising water flooded valley, hill, forest and farm to a depth of up to fifty feet, so that the lake is standing full of the skeletons of the former forest, or, what is worse to the logger, the snags of the trees that have rotted off at the water's edge and fallen, for these snags just below the water are as hard or a little harder than they were when green. The loggers' job was to cut these trees, often nearly as hard as iron and as heavy, roll them into the lake, float them through the snags and trees and load them on the cars at the railway. That we are getting the timber at all speaks well of the bush man, who is far from the indolent person he seems at first sight and is more the victim of conditions and lack of training, than a willing idler. He is doing the heaviest work regardless of the tropical discomforts of fever, insects, heat and rain. He has not the slightest knowledge of the American woodsman's tool, the machete, or brush knife, replacing with him all of the other implements of either husbandry or logging; and it is only

possible to induce him to give it up after a long season of education, but these men know the ways of the bush and will in time, learning the use of proper tools, become valuable workmen.

Many were to be the surprises and the mortifications of the cruiser who selected the timber to be cut. It was not enough that he must witness the weird freaks often indulged in by some innocent looking tree of apparently decent habits and good timber form, but the result of his judgment came in for most rigid inspection. Criticism seemed to be free to every one and he was generally held personally responsible for the behavior of his selections. A typical failure in choosing a species was that scored by the espavay, from which tree the natives have hued their canoes since time began. It grows to a large size, is common everywhere, floats and seemed likely to be just what was wanted for a rough building material. Indeed, it had been, so rumor said, successfully sawed in various faraway places. The first difficulty was encountered when the saw struck the log. One side cut all right, but the other was like rope, such a bunch of fuzz I never thought could come out of a tree. The sapwood on a large log would be a foot through, white or yellow, with a woven winding grain; the heart was red, gritty, hard and so



LIGNUM VITÆ, OR GUAYACUM, IN ITS NATIVE SURROUNDINGS

brittle that a six by six would break from a three-foot drop. The sapwood was stronger, but was attacked by millions of boring beetles that would destroy a timber in a single night. To stop these ravages the lumber was put into the kiln the moment it left the saw and by this means was rendered immune to further attack, but under this treatment it took to winding, twisting and splitting beyond expression.

Experiment finally showed that this species, treated to live steam and then dried under a shed with plenty of ventilation, while it showed a tendency to decay, could yet be used where strength was not required. The use of



NOTE THE GROTESQUE SHAPES INTO WHICH THESE ALMOND TREES (ALMENDRA) HAVE BEEN BENT BY THE TROPICAL WINDS

this species has been discontinued, the cost of saving it being disproportionate to the results obtained.

Other trees were tried, some of their lumber would split open in the sun and continue the process down to near the excelsior stage. Others that when fresh from the saw, seemed strong, serviceable lumber, yet dried up to be as soft as cork, or became as brittle as chalk. Some had poison sap, some decayed within a few weeks, and nearly all were attacked by borers and beetles.

Those first days were dark days indeed, but slowly one and another variety was found that stood all of the tests and proud indeed was the hour when lumber, actual lumber, fulfilling all requirements, began to pile up in the yard—lumber that one could trust alone over night without dire misgivings for the morrow.

Three soft wood species have proven their value, but these, while very beautiful and useful, are not in sufficient stand to be of commercial importance; indeed, it is difficult to secure all that we need for our own uses, but the hard wood is a very different story. We have large stands of this and they should be of the greatest importance to the trade.

Lignum Vita, generally well known, is plentiful and has been supplied to the various navy yards, where it has given entire satisfaction. It is a very large tree and is unbelievably strong and is heavy as well, about seven pounds to the board foot. The natives bring it in slung under a dugout canoe in logs up to forty inches in diameter and fifty feet long.

Nispero, or bullet wood, is the local rubber tree and is the wood eternal. Timbers in the old Spanish forts along the coast are still sound after a century or so of exposure to the weather. This wood is springy as well

as strong and splits well. What wonderful ties it would make, and this may be the eventual use of the timber, for the gum hunters in their rush for rubber have girdled every tree in the forest and all are dead or dying. These trees will, of course, stand for many years to come and may still be utilized.

Almendra is a larger tree even than the *Lignum Vita* and the most plentiful hardwood in the forest. It is unexcelled for fenders and heavy ship work requiring timber harder and stronger than oak. Some *Almendra* fenders were put on a heavy dredge between sections of white oak by way of a test, and within three months were reported as an absolute failure. This was a heavy blow to the somewhat friendless individual that stood sponsor for the species used and great indeed was his relief when examination proved that the *Almendra* stood without a mark while the white oak chafed to pieces. The crew, following the usual custom, jumped to the conclusion that the native species was no good. Indeed, I have found that the native substitute has to be far better than the timber it supplants in order to pass the willing and self-appointed critics. The climate is far from kind to any wood. Oak goes to pieces in about six months, sap pine in a few weeks, but the casual observer does not know this and judges native species with the behavior of lumber in the States. There are many other valuable woods of which we are learning slowly. Some day, perhaps, the sum of our knowledge will enable private capital to unlock some of the vast storehouses of the interior (Government operations will doubtless be confined to the Canal Zone). Heretofore the maze of worthless timber and lack of definite knowledge as to what really was merchantable has effectually barred the good timber from a long ready market.

FOR THEM A TREE STANDS THERE

GEORGES CUVIER was born in 1769—one hundred and fifty years ago. This pupil of Linnaeus is rated one of the greatest naturalists the world has ever seen. Perhaps only to the elect is the name Cuvier known, but people are noting the century and a half since he was born, so great has been the interest awakened in the planting of things. The planting of Memorial Trees easily takes the lead in this revival. In the planting of the living, growing tree the people of this country are erecting their own memorials not only to those who gave their lives to their country but to those who offered their lives. The planting takes many forms and is not confined to remembering war heroes. Just the other day the Whitman Park Improvement Association planted a tree in honor of Walt Whitman to mark the hundredth anniversary of the poet's birth. In many schools and colleges, graduating and incoming classes are planting Memorial Trees to come back to at future reunions. One of the most far-reaching forms of co-operation with the American Forestry Association is the call to the Christian Endeavor Societies of the World to plant Memorial Trees. This call has been sent out by the Rev. Francis E. Clark.

All Memorial Tree planting should be reported to the American Forestry Association at once, so it may keep its honor roll of such planting complete.

Following the suggestion made by the American Forestry Association that Memorial Trees be planted in honor of Jane A. Delano, of the Red Cross, the first tree reported placed in her memory was at Canton, Pennsylvania, her home, by the Village Improvement Association. Thirteen trees were planted on the playground maintained by that organization. One of these was planted in memory of Sidney R. Drew, the son of the actor, whose home was at Canton. Twelve trees were planted in a circle and the tree for Miss Delano was placed in the center. The exercises were opened with the singing of "America" and Mrs. Emmeline Leavitt, the oldest member of the Daughters of the American Revolution in the state of Pennsylvania, said the prayer. Mrs. Frederick W. Taylor, the president of the Association, gave the address. Mrs. L. M. Marble, of the Canton Red Cross, a neighbor of Miss Delano, told of the Red Cross worker's love of the hills about Canton and how she had expressed a hope to return to them as soon as the war work was ended. Mrs. Charles H. Derrah was in charge of the exercises. The Canton honor roll will appear in an early number of this magazine.

Another impressive ceremony was the dedication of the "Patriot's Grove," near Philadelphia, by the National Farm School. Here trees have been planted in honor of those who gave their lives to their country and in honor of those who offered their lives. A flag pole was dedicated to the memory of Henry F. Singer at the same time. In the list of speakers at this ceremony were Judge John M. Patterson, Edward Bok, John H. Mason, Joseph

Pennell, Harry W. Ettelson, Franklin Spencer Edmonds. Though not as large, of course, this grove is along the same idea as that one planted at the United States Army Balloon School at Ft. Omaha and Ft. Crook. At these places Col. Jacob W. S. Wuest has directed the planting of five thousand trees in memory of those who died and in memory of those who served from that camp of instruction. Two of these trees are for Red Cross workers who died at the camp. These trees are being marked by the next of kin with the bronze markers designed by the American Forestry Association. This list will appear on the honor roll in a forthcoming number of the American Forestry Magazine, as will that of the National Farm School. A "Hero Grove" has been dedicated in Golden Gate Park, in San Francisco. At this dedication one of the most remarkable demonstrations was seen. Daughters of the Golden West laid Wreaths of Remembrance on an obelisk in the park. These wreaths came from hundreds of towns and cities in California. The citizens joined in the biggest Community Sing the city had ever heard. A great community spirit is being born out of Memorial Tree planting. Coloradoans in San Diego are making plans to plant a Memorial Grove at Camp Kearny. Miss Isabella Churchill, the secretary of the Quadrangle Committee, 2170 Fourth Street, San Diego, has sent out a call to all Colorado people to help in marking the spot where the camp is maintained, for it was through this camp many boys from that state passed.

Another example of community work is the building of a Memorial Park at Reading, Massachusetts, in one day. Everything was planned weeks in advance and everyone had a place in the all day work. A wilderness was turned into a beauty spot and the honor roll from Reading will appear in American Forestry shortly. At Lynchburg, Virginia, Honor Oaks have been planted at a ceremony attended by a tremendous crowd. E. F. Sheffey, president of the board of aldermen, presided. Rev. Joseph B. Dunn and Dr. James D. Paxton took part in the ceremony, which was conducted by J. T. Yates, J. C. Woodson, and G. H. Read, of the Park Department, and a committee from the Woman's Club, of which Mrs. James R. Kyle was chairman. In Cincinnati, pupils of the Avondale School planted Memorial Trees and at the ceremony Leona G. Van Ness, of the third grade, dedicated the trees. Miss Annie L. Kinsella informs the Association that the little girl based her talk upon suggestions she found in three copies of American Forestry. Another school to plant Memorial Trees is the Municipal University of Akron, Ohio. The planting of Memorial Trees by the graduating class of Georgetown University, when fifty-four trees were placed in honor of her sons who gave their lives in the war, is the most extensive planting by a college thus far reported to the Association. The trees, Lombardy poplars, typical of France, were planted in "The Walks," which is surrounded by a natural amphitheater of sloping, wooded hills. The trees

LIVING MEMORIALS FOR THOSE WHO DIED

On left—Planting of Victory Oaks at Lynchburg, Virginia.

On right—Leona G. Van Ness planting Victory Oak at Cincinnati.

Below—Dedicating "Grove of Heroes" in Golden Gate Park, San Francisco.



are marked with the bronze marker designed by the Association. Dr. Ernest LaPlace, of Philadelphia, delivered the oration dedicating the trees.

Making our motor highways "Roads of Remembrance" is a suggestion of the American Forestry Association that has been taken up throughout the country. The suggestion was made coincident with the start of the Motor Transport Corps' transcontinental run from Washington to San Francisco. Newton D. Baker, the Secretary of War, dedicated the Zero Milestone from which the truck train started. The Association urges planting of Memorial Trees, Memorial Parks and Memorial Groves with the routes of the motor highways in mind. Indeed, the erection of any form of Memorial should keep the routes in mind, the final result being one vast chain of Memorial Drives that will make the country easy to see and at the same time the most famous touring country in the world. With France as an object lesson and the United States

facing a road building era involving the expenditure of half a billion dollars, there is a fine opportunity to do something big in an educational way for forestry by having the people, by county units, beautify these roadways. The beauties of French roads are widely known. A Roads of Remembrance campaign has been taken up in Great Britain. In France road building is going forward that will connect the cemeteries and the famous battlefields. We in this country do not have these battlefields and cemeteries to connect, but in connection with the erection of memorials of one kind and another, why cannot a definite plan be worked out whereby the memorial can be placed within easy access of the motor highways? Then, with the proper planting of Memorial Trees having been done in the meantime, we will have a countrywide memorial which will be worth while and a fitting tribute to the men who answered their country's call.

NATIONAL HONOR ROLL, MEMORIAL TREES

Trees have been planted for the following and registered with the American Forestry Association, which desires to register each Memorial Tree planted in the United States. A certificate of registration will be sent to each person, corporation, club or community reporting the planting of a Memorial Tree.

WASHINGTON, D. C.—By Georgetown University: John B. Ahearn, James C. Amy, Melvin M. Augenstein, Joseph Baumer, David L. Bawlf, J. A. Beck, Charles T. Buckley, Douglas G. Cameron, M. J. Carroll, Thomas C. Carver, John Cissel, Edmund J. Crowe, Walter P. Desmond, Dennis R. Dowd, Jr., Ralph E. Donnelly, Julian N. Dowell, James P. Dunn, Alexander P. Finnegan, Arnulf Gloetzner, James L. Goggins, August DeY. Green, Robert M. Hanford, Harold Hall, Maurice L. Harding, Warren G. Harries, Albert Holl, Charles W. House, Grandville Jones, Louis J. Joyce, John J. Keady, Joseph T. Keleher, William L. Kelly, James L. King, John Lyon, Ernest P. Magruder, John Mahlum, John W. Marino, John A. Martin, Joseph G. McDonald, William F. McNierney, William F. Miltenberger, T. J. Moran, Leo Malcolm Murphy, Frank Murray, Joseph A. Parrott, Edward S. Pou, Gilbert Sanchez, William A. Sheehan, Francis M. Tracy, A. G. Vanderlip, Julian Robert Worthington.

CANTON, PA.—By Village Improvement Association: Jane A. Delano, director general, nursing department, Red Cross; Leroy G. Clark, William Mandeville, Gordon B. King, Corp. Sidney R. Drew, Mack M. Jenkins, Ernest Williams, Sgt. Ray Myron Crandle, Paul Turner, J. Howard Wilcox, Howard Soper, Leon C. Wilcox, Corp. J. Harry Mason.

CHAMBERSBURG, PA.—By Falling Spring Presbyterian Church: Lieut. James G. Nixon.

CORAOPOLIS, PA.—By Coraopolis High School: John Arthur Holmes, Vance Hays, John Wesoloski, David Pugh.

DEVON, PA.—By Mrs. Emory McMichael: Lieut. William Bateman.

EAST STROUDSBURG, PA.—By White Oak Run School: J. L. Strockbecker.

MIDDLEBURGH, PA.—By Shambach and Wagenseller: Charles F. Mitchell.

PHILADELPHIA, PA.—By National Farm School: Louis Berkowitz, Jacob Bledenthal, Morrie A. Deutsch, Jerome L. Goldman, Lieut. Jesse Warren Guise, Simon C. Hellman, Joyce Kilmer, Roy Stewart Marlow, Dr. G. M. Neuberger, Sgt. Harry Polinsky, William C. Rees, Byron H. Reis, Capt. Eugene Rice, George Burton Rosenthal, Alexander J. Roth, Lester B. Rothschild, Mortimer Strauss Rubel, Henry F. Singer, Solomon Spicker, Milton Stern, Bernard W. Traitel, Eli Wittstein, Lieut.

Ralph Anspack, Herman L. Artzt, Nelson H. Artzt, Justin S. Bamberger, Eli D. Bernheim, Harold B. Blumenthal, Albert Coons, Jerome Drucker, Isadore J. Faggen, Samuel Faggen, Leon Feigenbaum, Ensign Milton Stanley Getz, Herbert F. Goldstein, Jacob F. Goldstein, Ralph Gutlohn, Julian A. Hillman, Sgt. Isaac L. Hyman, Dr. Leopold Max Jacobs, Reuben Jacobs, Charles S. Kaufman, Corp. Walter Kaufman, Sgt. Manfred R. Krauskopf, August Manasses, Dr. Jacob L. Manasses, J. DeRoy Mark, Leonard George Needles, Isadore Oppenheimer, G. Sidney Reinheimer, Leon W. Reinheimer, Herbert D. Reis, Eli M. Rohrheimer, Sgt. Jeromè H. Rose, Sgt. S. Ralph Schwarzschild, J. Leonard Sessler, Arthur Shoenberg, Arthur Silverberg, Edwin H. Silverman, Leonard Sostunann, Capt. Camille Stamm, Morris H. Starr, Arthur A. Strouse, Frank L. Teller, Ensign Jerome L. Teller, Philip H. Weinberg, Gustave L. Winelander, Stanley S. Wohl, Myron Albert Zacks.

VALLEY FORGE, PA.—By Daughters of the American Revolution: Lieut. Warren T. Kent.

HIGHTSTOWN, N. J.—By the High School: Harold Fones, Lewis Forman, Samuel Platt, Jr.

HOBOKEN, N. J.—By the High School: Frank LaPointe.

JERSEY CITY, N. J.—By Schools Nos. 1 and 16: Frank Braitsch, Louis Cohendet, Alexander Brady, Henry Johnson, George Devlin, Joseph Weinert; by School No. 4: Dr. Leonard M. Kalaher; School No. 5: Boys of Neighborhood; School No. 19: Michael Keaveny, Harry R. Holler, Louis Halperin, John J. Doris, Michael P. Smith, Thomas O. Dorward, Anthony Mafarra, James T. Barke, William H. Reuter; by School No. 21: Boys who had attended School No. 21; by School No. 30: Roy Losey; by School No. 32: Max Frank, Francis Dillon, Frank Sardoni, James Mason; by School No. 33: Roosevelt, Victory, Peace, Foch, Wilson, Pershing.

NEWARK, N. J.—By Memorial Tree Committee: Sgt. Irving C. Olstrum; by Boy Scouts of America: Theodore Roosevelt.

PARK RIDGE, N. J.—By Free Public Library: Edward B. Abrams, Charles F. Stalter, Fred H. Pysner, Martin F. Casteloni, Lester McGinnis.

PLAINFIELD, N. J.—By Watchung School: Holmes E. Marshall, Russell Hall, John H. Down, Benjamin H. Giles.

RAHWAY, N. J.—By Wilfred Smith: Lieut. Henry W. Cleary.

TREE PLANTING BRINGS OUT COMMUNITY SPIRIT



Upper—A community sing was one of the features of tree planting in San Francisco, and this picture shows what interest can be aroused when the "gods' first temples" are used.
Lower—Part of the throng at Lynchburg, Virginia, when memorial trees were planted.

RED BANK, N. J.—By the High School: Lieut. Herbert O. Tilton.

SOUTH ORANGE, N. J.—By St. Andrew's Church: John W. Weir.

TRENTON, N. J.—By Mrs. Elizabeth O. Hunter: Lieut. E. Oliphant.

WEST ORANGE, N. J.—By West Orange High School: James Sayers, Miles Suarez.

ASHVILLE, N. Y.—By members of Ashville Grange 694: H. Vincent Moore.

COLLINS CENTER, N. Y.—By the High School: Dr. Herbert W. Mackmer.

DOLGEVILLE, N. Y.—By Boy Scouts of America: Theodore Roosevelt.

MOUNT VERNON, N. Y.—By Westchester Woman's Club: William Wiley Hayward.

NEW YORK CITY—By Mrs. Regina Rubel: Lieut. Solomon Rubel.

OGDENSBURG, N. Y.—By St. John's Episcopal Church: Frank M. Hanbidge, George Ashwood, Frank S. Harper, Clarence Merris, Charles Holbrook, Clarence W. Streeter.

SYRACUSE, N. Y.—By St. Patrick's Church: Sgt. John J. Hogan, Raymond Koagel.

VALATIE, N. Y.—By Chatham Union School: Miss Catherine Smith, Soldiers and Sailors.

COLUMBIA, TENN.—By Business Women's Association: Lieut. Clarence H. Fry, Lieut. J. C. Wooton, Sgt. Joe B. Warren, Walter D. Goodwin, Clifford Earl Hutchinson, C. W. Hamilton, Jr., Corp. James W. Wilson, Horace Hickman, Melvin White, Eli Richard Haywood, William Rufus Crumley, Corp. Eugene W. Huckaby, Walker Fitzgerald, Tom Workman, Corp. Herbert L. Griffin, Lieut. Robert B. Gilbreath, John Thomas Richardson, Corp. Basil O. Blocker, Wilson D. Holman, Robert A. Hays, Capt. Meade Frierson, Jr., John Will Thompson, Rex Bernard Vestal, Osey Jones.

KNOXVILLE, TENN.—By Park City Presbyterian Church: Lieut. William Hugh Eckel, Dick Dickson.

NASHVILLE, TENN.—By Fall School: Guy R. Only, Raymond F. Houston, John W. Weber; by Tarbox School: Capt. Charles Duncan, Harold Goodwin, Marshall Goll, Emmet Manier, Carter Milan, Ed J. Walsh, Dan Wasserman, Walter S. Yarbrough.

GREEN BAY, WIS.—By Mrs. C. Richard Murphy: C. Richard Murphy; by Miss Jessie DeBoth: Lieut. E. R. DeBoth; by W. D. Fisk: Hiram Fisk, Arthur C. Neville, Sgt. William H. Livie; by P. H. Martin: Lieut. John Martin, Lieut. Jerome Martin, Joseph Martin; by Mrs. Margaret Parmentier: Capt. Jules M. Parmentier, Capt. Douglas Parmentier; by Mrs. Arthur McCarey: Major Arthur McCarey; by Mrs. M. E. McMillan: Myron McMillan; by Mrs. Frank H. Hoberg: Lieut. Leroy Hoberg; by Mrs. J. P. Lenfesty: James Nuss; by Mrs. Herbert MacPherson: Capt. Leland Joannes, Kenneth Hoefel; by Mr. J. R. North: Reynolds North, Ludlow North; by Mrs. Mitchell Joannes: Lieut. Frederick Kendall; by Mrs. W. E. Cóllette: William Harold Collette; by Mrs. R. C. Buchanan: Frederick C. Parish, Edward Tyrakoski; by Mrs. Fred L. G. Straubel: Major Clarence Welse Straubel; by Kellogg Public Library: Patrons of the library; by Mrs. S. D. Hastings: Women's Committee of Brown County, Council of Defense; by Mrs. A. C. Neville: the nurses of Brown County; by the Country Club: Lieut. Harry Howland Fisk, Lieut. Robert S. Cowles, John Parrish, George Van Laanan, John Vance Laanan, Capt. V. I. Minahan; by Junior High School: Lieut. Reginald Calkins.

AKRON, OHIO—By Students of the Municipal University: Thomas B. Welker, Thomas J. Quayle, John Laube, Lee W. Pitzer, Bernard Adler, Ray A. Bohl; by The Boy Scouts of the Goodrich Rubber Company: 250 trees for Theodore Roosevelt.

CINCINNATI, OHIO—By West Fork School: Roman J. Heis, Henry W. Deucher; by Pleasant Ridge School: Lloyd McArthur, Earl L. Parrott; by Westwood School: John Henry Koenig, Dr. Clement Laws, Anthony Schwab, Jens Paterson, Edwin Harder; by Oakley School: Norman Le Roy; by Bond

Hill School: Hanley Masters, Walter Volkert; by Carson School: John Rowan, Walter Sang; by Whittier School: Lovett Channel, Clifford Paddock, Wesley McKinney, Harold Van Matre; by Eighth Grade Civic Club: The Heroes, William Heiert, Our Fallen Heroes; by Seventh Grade Civic Club: Frank Wagner, Ralph Wagner.

ELMWOOD PLACE, OHIO—By Elmwood Place High School: Homer L. Gilbert, William H. Peters, Ralph D. Breckel.

TWINSBURG, OHIO—By Boy Scout Troop No. 1: Orland Bishop.

BAXTER SPRINGS, KAN.—By Baxter Springs Women's Club: Nathaniel Burns, Harry E. Davis, Albert McCoy, Frank Morford, Frederick Young, Leonard Armstrong, Clarence McCullough, Albert Schroeder, Grover C. Taylor, Francis Roland Romack, Clinton West, Harry G. Smith.

LAWRENCE, KAN.—By Lawrence Public Schools: Mark Beach, Albert Ellis Birch, Max Brown, John Wilfred Charlton, Charles Luther Cone, Everett Demerritt, Eli Ferril Dorsey, Ralph Ellis, Herbert Jones, Thomas Kennedy, Harry Ziesenis, Artemus McClure, Clark William McColloch, Glen Otis, Ross Rummell, Oliver Cromwell Tucker, John, Tupper, Theodore Rocklund.

DETROIT, MICH.—By Juvenile Detention Home: Lieut. Clifford B. Ballard.

TIPTON, MICH.—By the Red Cross: E. Leroy German.

FORT OMAHA, NEB.—By United States Army Balloon School: John Nagel, George Joseph Pahl, Maude Mae Butler, Walter P. Peterson, George H. Williams, Zell S. Killingsworth, Vernon G. Heverly, Dan A. Jacobs, Albert A. Bachand, John J. Nimmo, Albert L. Mower, Oscar K. Westberg, Hugh Scanlan.

NORFOLK, NEB.—By the High School: Charles Hyde, Harry Koenigstein, Roy McCaslin.

SUTTON, NEB.—By Mrs. A. W. Clark: Louis Case, Daniel Zimmerman, John P. Pauley.

AURORA, IND.—By Aurora Women's Research Club: Dewey H. Hauck, Henry Scharf, Russell Winkley, Bernard Burke, Frederick S. Steele, William Keith Ross, Charles Bildner, John Bildner.

EVANSVILLE, IND.—By Mrs. William Igleheart: Lieut. Douglas Viele.

GOSHEN, IND.—By Chamberlain School: Mayor Daniel J. Troyer.

CAIRO, ILL.—By Cairo Women's Club: Claude C. Robinson, Corp. Leonard A. Clifford, Paul Cochran, Lieut. Paul Clendenen, Hans Miller, Joseph Glynn, James Herring, Corp. George Mills, Arthur Lieberman, Morrin Langon, Cecil M. Reynolds, Dan Crowley, Jesse Lewis, Eddie Street, Edward Mart'n, David Brice, James Johnson, Charles F. Stokes, Willis Holland, Hunter Barksdale, James Bowden, Thomas Scarber, Lieut. Albert Stout, Sgt. Frank Gibson, Felix Eakins, George Coleman, Will Smith, Robert S. Courtney.

BELLEVILLE, ILL.—By School No. 2: William T. Smith; by School No. 4: Carmine Caruccio; by School No. 3: George A. Younginger, Charles E. Morgan and George J. Kalvio.

CARBONDALE, ILL.—By Capt. John Brown: Donald Forsythe, Curtis Allison, William Watson, Lieut. Arthur R. Carter.

WHITE HALL, ILL.—By White Hall Round Table: Charles Martin; by White Hall Domestic Science Association: John Fisher; by White Hall Art League: Amos Walker.

ELGIN, ILL.—By Mrs. Edgar Post: Helen Penrose.

STAFFORD SPRINGS, CONN.—By Anna Handel: Madison Willis.

NORFOLK, VA.—First Christian Church: Shirley Owens.

DIXIE, WASH.—By Dixie School: James Lauritson, Oliver Hastings.

TACOMA, WASH.—By Stadium High School: William Campbell, Malcolm Johnstone, Herman Uddenburg, Charles Huckaba, Elmer Anderson, Wilbur Cook, Arthur Wales, Clyde Moore, Duane Shields, Asa Purkey, George Muir.

MT. VERNON, WASH.—By Washington School: William Hilliker.

MYSTERIES AND REVELATIONS OF THE PLANT WORLD

BY D. LANGE

(WITH PHOTOGRAPHS BY THE AUTHOR)

THE GREAT Swedish naturalist Linnaeus, the father of modern scientific nomenclature, described about 10,000 different plants. Since his time scientific explorers have gone out to all parts of the earth to continue the census of the plant world, but to this day the census is still so far from complete that every year a hundred or more field men can each bring large collections of new species to the great herbariums of Europe and America. So vast has grown the number of plants discovered and described that if Linnaeus could come back to his beloved Upsala, he would be lost in his own realm, for his modest census of 10,000 plants has grown to the bewildering total of 250,000 and will very likely pass 300,000 before the last returns are in, if in fact, there will ever be any last returns.

Of this vast number of plants probably about 10,000 are trees ranging in size from the dwarfs, four feet high to the giants that reach nearly four hundred feet toward the clouds. About 150,000 species would be classed as flowering plants, including grasses, herbs, trees, vines and small woody plants of all kinds.

The delicate fronded ferns

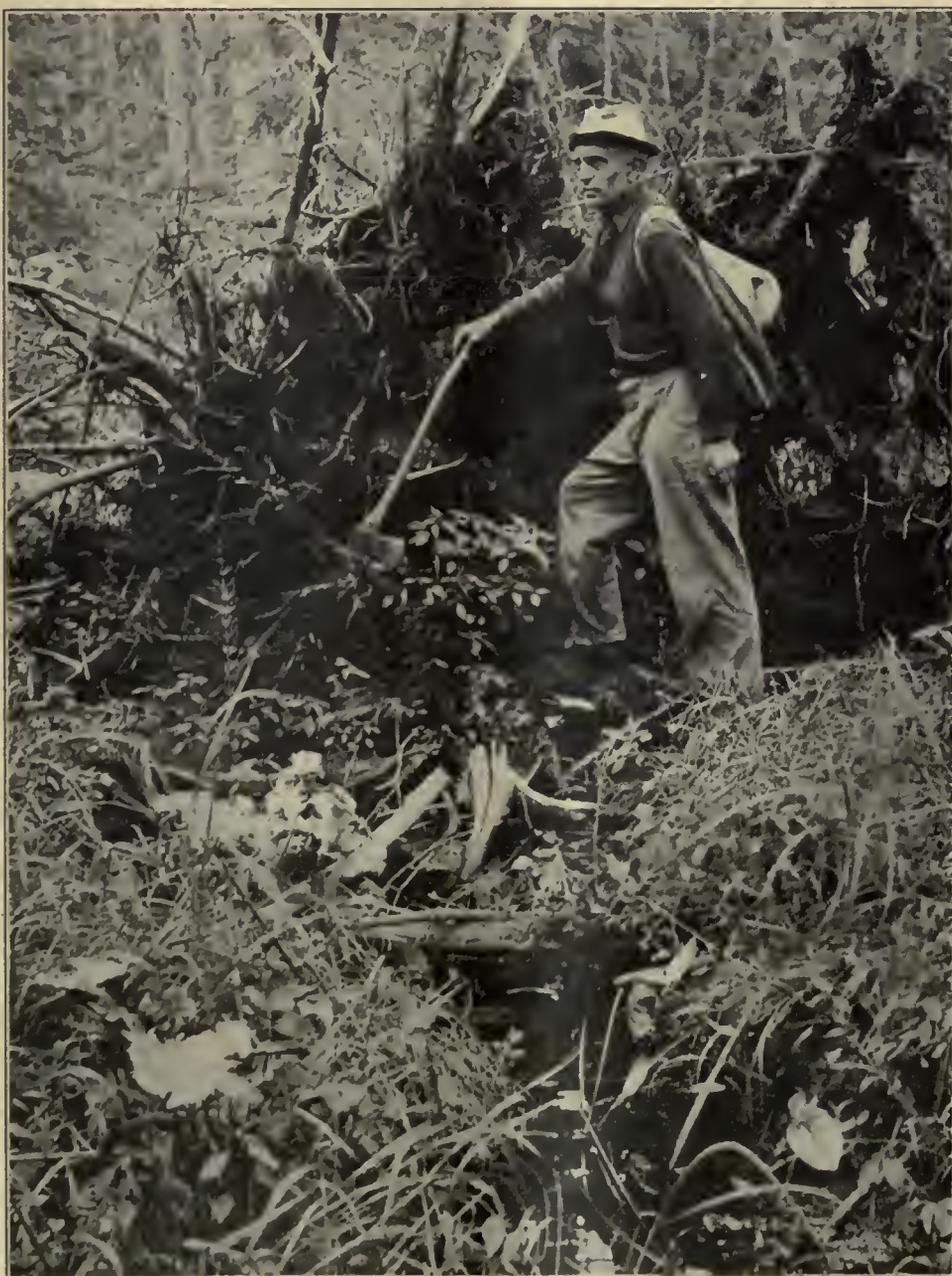
and their allies, the highest of the flowerless plants, would be represented by about 3,000 species mostly from tropical regions; and the tiny mosses, the humble pigmies among leaf-bearing plants, would add 16,000 species to the list.

The remarkable plants known as algae, which float as threads of green scum, or live as little green balls in water or moist places, or grow in the sea like the giant kelp, swell the census by at least 15,000.

The list would close with about 65,000 of that wonder-

fully diverse class of vegetable forms known as fungi. This class includes the small one-celled yeast plants, the parasitic blights, rusts and smuts, the various umbrella-shaped fungi popularly known as mushrooms and toadstools, the puffballs and many others. Each one of the 300,000 species lives and grows in its own peculiar way, but of very few do we know anything that approaches a complete life history.

Among this countless host of plants some species like certain orchids are so rare that several thousand dollars have been paid for one plant, while others flourish in associations so



THE BIRTHPLACE OF THE "FATHER OF WATERS"

The great Mississippi River starts as a small beaver stream under the roots of a fallen tamarack in Itasca Forest, Minnesota.

great that they cover large sections of whole continents. The best known but not the only examples of the latter are the grasses of the North American prairies, the conifers of our evergreen forests, and the broad-leaved trees of our great deciduous forest.

The heart of the great deciduous forest was the Ohio Valley. This forest consisted of an association of many



THE SHOWY ORCHID

One of the most beautiful flowers and readily identified as an orchid by its characteristic odor and taste, differentiating this class from all other plants.

species, and a century ago, it stretched almost without a break from the Atlantic Coast to Western Minnesota.

North of this broad-leaved forest extended a belt of evergreens to the limit of trees into sub-arctic regions and westward to the treeless plains. This vast forest consisted however of comparatively few species. In its southern region the white and Norway pines were the dominant trees. They grew taller and lived longer than any other species, and where fires or storms had not interfered for a century or two they had crowded out, or at least suppressed every other kind.

Farther north, especially on poorly drained lands, the black spruce becomes dominant, while vast swamps, too wet for the spruce, are covered with tamarack, which on better and higher land was crowded out by pines, spruces and other species.

From Illinois to the foothills of the Rocky Mountains stretched the largest grassy meadows of the world, known as the prairies.

The question why these great fertile regions remained treeless is not easily answered. Over a part of the prairies the rainfall is insufficient to meet the great demands of trees for water. For contrary to the popular idea, forests do not cause rain-

fall, but an abundant rainfall makes forests possible.

However, over a large part of the prairies other factors have operated against the spread of trees. The grasses developed early in the geological history of North America, and when the plains first emerged from the sea, the grasses were able to cover the soil before the trees could reach the new land. The compact unbroken sod formed by their roots made it difficult for trees to secure a footing, but wherever the soil was broken by streams and the waves and ice of lakes, trees and shrubs have successfully invaded the great plains and now fringe every lake and river.

Nearly all the prairie grasses and flowers are perennials well fitted to resist annual or occasional severe droughts. Nor could millions of grazing buffaloes and the fires started by lightning or by primitive man harm the underground rootstock of these plants. To seedling trees, however, a fire means almost certain destruction.

On the western plains in the Bad Lands region and in



SKUNK CABBAGE—FIRST FLOWER OF THE NORTHERN STATES AND CANADA

The large seeds have most likely been scattered by bears.

the foothill country the short grasses are rendered still more drought-resistant by having their roots protected by hard impervious sheaths. These grasses produce the black-root sod, which western ranchers and pioneers employ as building material, and the walls constructed of black-root sod are almost as durable as those built of brick.

Leaving out of consideration here the rather complex problem of plant distribution over the Black Hills, the Rocky Mountains and the Great Basin we reach on the

Sierra, the Olympic and the Cascade Mountains the grandest and most remarkable forest of the world, which stretches from California northward to the limit of trees in Alaska, through more than two thousand miles of latitude.

From California to Puget Sound is a forest of enormous redwoods, yellow pines, Douglas firs, western hemlock and other evergreens, including the remarkable isolated groves of giant sequoias containing trees of almost incredible size and age. But not only the great sequoias but also the redwoods and firs are giants, often reaching a height of two hundred to three hundred feet. In these forests the little Douglas squirrel and a number of small birds live permanently in the tree tops and, as one boy expressed it to me, can only be studied through a telescope.

In extent, in density, in the kinds and size of their trees, these forests have no rival on our planet.

Besides the fascinating questions regarding the size, the distributions and survival of their component species they present another perplexing problem: They are the most exclusively coniferous forests in the world. Broad-leaved trees here and there make up six per cent of the whole, but in many regions they form only a small fraction of one per cent.

Very few representatives of our eastern forest regions can be found here. There are no elms, no hickories, no chestnuts, no catalpas, persimmons, sassafras, magnolias; no lindens, no tulip trees, no locusts; and many other whole genera found from the Atlantic coast to the plains are entirely absent.

Several oaks, a few maples, one birch, one ash and an alder are among the scant representatives of broad-leaved trees, but they seem to live only by sufferance in a forest which everywhere presents an unbroken array of the somber spires of the conifers.

In preglacial times the coast region did possess elms and beeches as well as gum trees, magnolias and chestnuts. Why these and others have disappeared never to return is one of the great riddles of the plant world.

In some regions of the earth, a rankly growing vegetation has almost suppressed human and animal life. This is true of the great rain-soaked beech forests of temperate South America, which Darwin describes so

well in his journey on the *Beagle*, and of the tropical forests of Africa. Another illustration of this dominance of plant life is furnished by the great tropical forests of the Amazon Valley of which the English naturalist and collector, Bates, has furnished us a classic account in "The Naturalist on the River Amazon." In tropical Africa human dwarfs have found a refuge in the impenetrable forest, and the monkeys of the Amazon Valley are compelled to live in the tree tops.

The greatest development of higher animal life has taken place in open and comparatively dry regions. Semi-arid South Africa is the home of the greatest number of species of big game, while the buffalo herds of the North American prairies and the caribou herds of the Arctic tundras, are equalled nowhere else on earth.

The length of life among plants varies even more than among animals.

The edible inky mushroom produces its umbrella-shaped column over night. A few days later the whole plant has deliquesced into a patch of black ink, and within a week not a trace is left of its existence.

The giant sequoia, on the other hand, has outlived the great empires of human history, enjoying a vigorous growth for three or even four thousand years. No fungus or insect pest is able to harm it. Its top reaches three hundred and fifty feet toward the sky and if storms, lightning and resulting fires did not at last bring it down, it seems that it might live and grow forever. And when, in the end, the giant trunk has



A RIVER BOTTOM FOREST OF YOUNG ELMS

The seeds of the elm, birch, maple and ash are carried by both wind and water.

crashed to earth amongst the smaller trees surrounding it, a long depression in the soil tells of the big tree even centuries after forest fires have consumed the enormous mass of sound wood, to which fungus, insects and the tooth of time could do no harm. Some of the giants still growing in Mariposa Park were already big trees, as New England and Minnesota measure trees, when Abraham pastured his flocks in Palestine.

Curious and innumerable are the methods of traveling adopted by plants. Most plants can, of course, travel only as seeds, although there are not a few exceptions to this rule.

The advantage of the first comer, the squatter, one might say, plays an important part in the world of plant

life. The cotton tufted seeds of willows and poplars, and the little winged seeds of the white birch are carried by the wind in every direction, and they are produced in such abundance, that every nook and patch of bare soil receives its supply. The result is that these trees generally reach vacant land sooner than any of their competitors. The bare mud-flat left by a flood, the railroad gravel pit, the burnt-over and cut-over pincry are nearly always pre-empted by willows, poplars, or birches because their seeds are much more widely disseminated than the seeds of any other northern trees. Poplars and birches, however, are short-lived trees, and within a century the dominant pines will supplant them.

Shrubs and trees, as well as vines and herbs, that depend on birds for the dissemination of their seeds run the wind-planted species a close race. Woodbine and wild grapes, elder, dogwood and hackberry, wild cherries and plums, strawberries and raspberries spring up as if by magic as soon as the lumberman, fire or storm have cleared the ground for them.

Of many plants it is not very difficult to discover their methods of traveling.

The seed of maple, pine and dandelion sail like parachutes away from the parent plant. The gold-dotted hedges of jewel weed, or touch-me-not, which mirror their delicate flowers and foliage in the dark, silent water of northern beaver ponds are planted by the beavers themselves as they travel and work on their dams; while birds in their daily and seasonal flights, plant those remarkable gardens of many kinds of wild fruit, whose presence on widely separated islands and mountains and in the depth of isolated canyons delights both the eye and the palate of the explorer.

There are, however, numerous instances of plant distribution which present most interesting puzzles to naturalists and foresters.

The limber pine is a fairly common tree at an altitude of six thousand feet in the Rocky Mountains. It is not found on the stretch of two hundred miles lying between the Rocky Mountains and the Black Hills, but on the trail to Harney Peak, in the heart of the Black Hills, at an altitude of about six thousand feet, stands a grove of about twenty-five limber pines, the only trees of that kind thus far discovered in the Black Hills. How they traveled over the intervening two hundred miles is a

mystery. One of the most puzzling cases of plant migration or distribution is that of the devil's club. This plant is a common shrub in the moist forests of the Pacific coast and in certain localities in the Rocky Mountains, where, on account of its countless sharp spines it is the terror of woodsmen and timber cruisers. It is not found in the forests touching the Great Lakes, except in several spots on Isle Royale in Lake Superior. By what means it traversed the intervening thousand miles of plain and forest and established itself on an island in Lake Superior seems an insolvable riddle.

One possible solution must not be overlooked in such cases as that of the devil's club and the limber pine. They may be cases of a remnant vegetation, just as scattered groves of giant sequoias are undoubtedly only the remnants of former large sequoia forests.

Such remnants are not rare. On Sheep Mountain, in the Bad Lands of South Dakota, I found isolated groves of yellow pine separated by a distance of fifty miles from the yellow pine forests of the Black Hills. I was much surprised to find that porcupines had killed a large number of these trees that were trying to maintain their hold on life under severe conditions of climate and soil, for one naturally thinks of porcupines as inhabitants of moist northern forests.

There has just lately been discovered a natural grove of jackpine in the driftless area of Minnesota, in Houston county, the most southeasterly county of the state. These trees are outposts of a former period and were left far behind, as the belt of evergreens



GIANT COTTONWOOD GROWING CLOSE TO THE RIVER

A cottonwood will grow eighteen feet high from a seed in three seasons. Within sixty years it is a giant.

retreated northward with the vanishing continental glacier. On their shaded sandy hillside these northern trees may keep a foothold for centuries to come, although the jackpine forest has moved fully a hundred miles north.

The case of the Kentucky coffee tree has been a mystery to me ever since I first saw its odd, bluntly ending branches on a winter ramble in a Minnesota woods. The tree bears large bean-like pods containing big hard-shelled seeds resembling somewhat in appearance roasted coffee beans. The great pods remain on the trees through the winter. Neither the pods nor the beans float in water and are, of course much too heavy to be carried by the wind. The seeds are as hard as pebbles, and, as far as I have been able to discover, no birds or animals eat

them. I kept a dozen of them in water for a year and found by frequent weighing that they did not absorb even a grain of water; but I also found that if they are planted in fall they will sprout in the first or second spring following. One seed I gave to a tame gray squirrel. He drilled a small hole through the shell, but dropped the seed as soon as he had reached the meat.

The tree, although one of our rarer forest trees, is fairly well distributed from Tennessee to Ontario and from Pennsylvania to the Indian Territory, but it grows in small colonies, often miles apart. It is found on rich bottom lands and on islands in large lakes. It may be that grouse occasionally swallow the seeds as they swallow pebbles, for it seems impossible that the seeds could reach islands without the aid of some bird. It is likely that the passenger pigeons in days gone by distributed the seeds of the coffee tree.

A small cactus, the jointed opuntia, is widely distributed in arid regions from New Mexico northward. In some mysterious way it has reached many dry rocky ledges in humid Minnesota and Wisconsin. A few years ago on a canoe trip on Lake of the Woods I found a fresh joint of this cactus among the boulders of the Ontario shore in a densely wooded region. How the plant reached this spot has remained a secret to me.

A whole book of miracles might be written on the mutual adaptations between flowers and insects. That many flowers are adapted to cross-pollination by insects is a fact of common knowledge, but that some of these adaptations have been perfected, one might say, beyond perfection, is not so generally known.

All our species of milkweeds, for instance, depend for pollination absolutely on insects. The peculiar structure of the flowers makes any other method impossible. Moreover the work is restricted to wasps and to large butterflies and moths. Small insects, even those as large as houseflies and honeybees are not strong enough to pull the anthers, shaped like tiny saddle-bags, out of their sheaths. To those insects the honey-filled and sometimes actually honey-dripping milkweed flowers are like so many baited traps, as deadly and remorseless to the hungry insects as the steel traps of the fur hunter are to

bears and beavers. Their feet are caught on the specks of sticky gum, which mark the joint of the two halves of the saddle-bag anthers. Trapped in this manner they are held prisoners until they die, and their shrivelled bodies may be found on almost every patch of milkweeds.

One might think that the powerful bumblebee and the milkweed would make ideal partners, but such is not the case. These remarkable plants, which not only flow with honey, but also invite their insect guests by a strong honey scent, are utterly ignored by the big hungry bumblebee, who have, for some unknown reason, acquired a passion for the purple of the clover and the blue of lobelias and gentians; although to the human observer, getting honey out of these flowers seems a truly laborious task.

The closed gentian, found in bloom in this latitude from the latter part of August to the middle of October, furnishes one of the most remarkable cases of adaptation of a flower to bumblebees. The striking whirls of beautiful sky-blue flowers are evidently a kind of bill-board advertisement to bumblebees. But these magnificent blue flowers, often made still more conspicuous by being delicately tipped with white seldom open. Day and night, in sunshine as well as in rain and fog, they remain tightly closed. Many observers have been led to conclude that this fine autumn flower had abandoned cross-pollination and resorted to self-pollination; however, careful observation has convinced me that such is not the case. The bumblebees do get into these closed gentians. In fact, I do not think they miss a flower on those



A WONDERFULLY BEAUTIFUL SPECIMEN

This stately white pine was planted for shade and ornament near a city home.

plants that grow in the open, where the gentians are not hidden by tall grasses.

With great care the hard working bumblebee selects a flower that has not been pumped dry by a buzzing competitor. Then, with his strong and long proboscis he finds the opening in the closely folded floral segments. With his head he pries the five segments apart and now, literally standing on his head he kicks and pulls himself with great effort into the blue honey well, until only his defensive posterior and a pair of legs remain partly visible, and if he is not a good sized bumblebee he disappears altogether. I watched one on a sunny September day, and I thought he worked harder than any other

bee I had ever observed. He examined flower after flower, many he rejected without opening them, in some he remained only an instant, but in one he stood on his head for fifteen seconds. Why does his tribe ignore the inviting flowing wells of the milkweeds and work labor-

ly produced for protection against specific dangers.

Cattle will not allow young hazel, oak and most other trees and shrubs to survive in a pasture, but the thorn-apple bushes will flourish because their sharp thorns keep away the browsing cattle.

There is a certain tree, the honey locust, which I venture to say no boy has ever climbed, although the tree is common and well known from New York to Illinois and from Texas to Ontario. Around the trunk most formidable, branched thorns stand out, some reaching almost two feet in length with the thickness of a man's finger. The locust trees and their relatives have a tendency to run to thorns. Do the murderous looking thorns, set like bristling bayonettes around the trunk, perform a useful function, or are they merely a case of a family trait run riot? Perhaps they keep opossums, raccoons and bears from climbing the trees and de-



OPEN GROVE OF BUSHY RED CEDAR ON SHEEP MOUNTAIN IN THE BAD LANDS

The seeds of the red cedar are planted by the birds.

iously on such difficult flowers as clovers and lobelias and the refractory closed gentians? And why does not this flower open like other gentians? Are the permanently closed flowers only a device to keep out feeble unbidden guests, or do they also serve to exclude dew, rain and frost, which might injure the delicate floral organs inside?

We all know trees and other plants by their leaves, which in shape, size and position display endless variety. Is there a meaning to all the different shapes and positions, or are some of them just accidents that have no meaning?

In general it may be said that each plant has evolved or is trying to evolve that shape, size or position of foliage, which serves best under its special environment to intercept the most favorable amount of sunlight and to regulate best the absorption of carbon dioxide from the air and the evaporation of water into the air. But why have nearly all the oaks adopted the lobed pattern of foliage as their own, while the large pea and bean family almost unanimously favor the pinnate or divided form? The maples all adhere to their well-known family pattern, and no conifer departs from the needle-shaped foliage of pines and spruces.

Certain plant structures and substances are evident-

ly produced for protection against specific dangers. Each plant or family of plants produces certain substances which possess a characteristic taste and odor and other generic qualities.

Practically all the orchids of the world contain a sap of an odor and taste so characteristic that a blind person, with his hands tied, might distinguish orchids from other plants by using only his sense of smell and taste; but

thus far no botanist has discovered the meaning of the peculiar fluid of the orchid family. All the conifers of the world produce rosin or pitch. A



SCRUBBY WHITE PINE ON ROCKY ISLAND OF LAKE OF THE WOODS

A most attractive spot, and well patronized by vacationists.

thus far no botanist has discovered the meaning of the peculiar fluid of the orchid family.

All the conifers of the world produce rosin or pitch. A

very large number of composites, the typical prairie flowers, also produce small amounts of rosin, and the foliage of nearly all of them emits the pungent odor of rosin.

Trees are always exposed to attacks from two hosts of enemies, fungi and insects. A wound in a conifer immediately causes

a flow of rosin. The rosin embalms, so to speak, any fungus spores or insects that might find their way into the wound. The liquid rosin soon hardens and seals up the wound and, in the course of years, new wood grows over the antiseptic covering. The function of rosin in defending trees against insects was well shown in recent years after the great devastation caused in the yellow pine forests of the Black Hills by several species of bark-boring beetles. Fires and drought had weakened the trees and gave the beetles a great advantage for several years, so that they destroyed thousands of acres of fine forest. Then the government organized its forest service and prevented fires. Rainy seasons also returned, and the beetles began to be found dead in their tunnels under the bark drowned in the flow of rosin of the healthy and vigorous trees.

The meaning of the poison in the loco-weed of the western plains seems fairly clear. It protected the plants from extermination by the herds of wild buffalo, who evidently had learned to avoid it, for none of the early observers speak of finding "locoed" buffaloes. Domestic cattle, on the other hand have not yet learned to avoid it and are often killed by it, especially in seasons of poor pasture

But what is the meaning of the alkaline poison in the poison ivy and poi-



WHITE HEARTS, OR "DUTCHMAN'S BREECHES"
How they travel from woodland to woodland is still a mystery.

son sumach? Would it have the same effect on browsing animals that it has on the skin of many humans? The poison evidently has no injurious effect on birds, because they eat freely of the white berries and scatter the seeds far and wide.



BLUE ANISE-FLOWER OR GIANT HYSSOP
The method of dissemination of this lovely flower is also unknown.

Certain plant forms, although they must be fairly common in nature, are nevertheless rarely found by naturalists and botanists.

The little green floating duckweeds, abundant on every pond in late summer, seldom produce their simple flowers and although I have been familiar

with the plants since boyhood schooldays, I have never found the flowers.

The jointed scouring rushes, also known as horsetails or equisetæ, grow from small dust-like spores. They are

common plants, but it is almost impossible to find them in their first, or prothallium stage. Only once, in the month of July, did I find them as little green lumps on moist earth which had been pushed up from a lake bottom by a railroad fill. Many ferns are very common, but very few botanists and lovers of flowers have ever found the small heart-shaped fern babies except in greenhouses.

The beautiful pink-and-white moccasin flowers are fairly common in their favorite localities, moist meadows and spruce and tamarack swamps. But something seems to be mysteriously wrong with their methods of pollination and seeding. Many of the flowers remain unpollinated, and, of the millions of minute seeds produced, very few ever start a new plant. One could not find



BLUEBELLS OF SCOTLAND
The method of dissemination of this delicate flower is unknown.



RO SIN WEED

It grows twelve feet high and is the giant among prairie flowers.



CLOSED GENTIANS

Flaunting beautiful sky-blue flowers to tempt the bumble-bee.



BLUE LOBELIAS

The seeds of this dainty flower are probably scattered by the wind.

a seedling to a thousand adult plants. By the most careful search I have not found more than a dozen all told, and when a seed does start, it produces a most frail plantlet. Its stem, during the first season grows scarcely an inch high, the leaves are mere specks, and its tiny rootlets do not reach the soil through the thick cushion of moss on which the seedling nearly always starts.

Every year, however, the root approaches by a kind of hook-shaped growth a little nearer to the soil below, but I estimate that it must take a seedling from five to six years to establish itself as a vigorous plant whose future is assured. If nature had evolved a really successful plan of pollination and seeding in the moccasin family those beautiful plants should be a hundred times as numerous, for the mature plants are vigorous and hardy perennials.

One of the most widely distributed plants over the whole northern hemisphere is the pale-green peat moss, sphagnum. It covers thousands of square miles in Europe, North America and Asia; but it has almost aban-

doned the sexual method of reproduction, and the little spore capsules characteristic of all mosses are rarely found. I have traveled over and camped near peat bogs and marshes ever since my early boyhood, but only once have I found the brown spore capsules, and that was in a small rocky basin on an island in Lake Superior at the entrance to the harbor of Grand Marais. I took the plants home to my room in the hotel, and in the evening as I was reading by lamplight, my attention was attracted by several explosions, just barely audible. I began to watch my moss plants. The warmth of the room had dried the capsules to the explosive stage and every time one of the little shells burst, a tiny brown cloud of spores was thrown into the air. It was the most intimate performance in the great drama of the plant world which it has ever been my good fortune to witness. The scene was enacted on an August evening more than ten years ago, and every summer since then, I have looked for the little brown shrapnels of sphagnum but I have never found them again.



A NATIONAL FOREST POLICY

THE PROPOSED LEGISLATION

BY HENRY S. GRAVES

FORESTER, U. S. FOREST SERVICE

THE NEED OF A NATIONAL FOREST POLICY TO PROVIDE FOR THE PERPETUATION OF OUR TIMBER SUPPLY IS APPARENT TO FORESTERS, LUMBERMEN, TIMBERLAND OWNERS AND EVERYONE. WHAT THIS POLICY SHALL BE, HOW IT SHALL AFFECT PRIVATELY OWNED TIMBER LANDS, NATIONAL, STATE OR MUNICIPAL HOLDINGS, AND HOW A POLICY MAY BE ADOPTED AND ENFORCED, IS NOW THE SUBJECT FOR DISCUSSION.

AMERICAN FORESTRY MAGAZINE OPENS ITS COLUMNS TO ARTICLES ON ANY AND ALL PHASES OF THIS IMPORTANT TOPIC, AND OPINIONS ON THE SUBJECT WILL BE WELCOMED.—EDITOR.

ANY program of forestry which is comprehensive enough to anything like meet the needs of the country must involve the practice of forestry on privately owned timberlands. In my judgment this will not be brought about merely by educational methods. These have been tried for twenty years practically without result. There must be some requirement on the part of the public as to forest protection and as to forest renewal. The requirement must be nearly as possible equalized in all sections of the country and in all States so that no section or State will be placed at disadvantage.

The Forest Service has given considerable thought recently to the principles which must underlie any efforts toward the attainment of this desirable end. We have reached the conclusion that a satisfactory measure of success can be attained only through some plan of co-operation between the States and the Federal Government, with the States the active agents for carrying the plan into effect and with the Federal Government stimulating action and aiding the States.

We have worked out some of the principles which it seems to me should form the foundation of the system to be built up through the necessary legislation by the Federal and State Governments.

The principles of legislation requiring the practice of forestry on private lands are briefly as follows:

1. The first step should be a Federal act authorizing the Secretary of Agriculture, in co-operation with any State, to formulate plans for forest protection and for the control of timber cutting within that State. Such plans should become effective only after the State legislature had passed appropriate legislation, including adequate appropriation to co-operate with the Federal Government in putting them into effect. The Secretary of Agriculture should also be authorized to accept plans for protection or cutting which have been adopted by any State. Section 2 of the Weeks Law dealing with co-operative fire protection would therefore be superseded. The act should carry an appropriation.

2. Farm woodlands should be specifically exempted from the provisions of the act, for the reason that protection and conservative cutting for this class of forest can best be brought about through the education and demonstration work authorized by the Smith-Lever Act. The Secretary of Agriculture should be authorized, in

co-operation with the State, to define farm woodlands and distinguish between them and commercial timberlands.

3. All commercial timberlands and all cut-over lands on which a commercial forest (as distinguished from a farm forest) could be grown should be subject to the provisions of the act. But the Secretary of Agriculture, with the approval of the State, should be authorized to exempt any of such lands where it is demonstrated that the surface of such lands is more valuable for other purposes than for the production of timber and where such lands are immediately to be used for the more valuable purpose.

4. Owners of timber should not be compensated either by the State or by the United States for expenses incurred in carrying out the provisions of the act where only the renewal of the forest is concerned. But such owners should be compensated either by the State or by the United States (if by the latter, in the discretion of the Secretary of Agriculture) in the following instances:

(a) Where for protection of the watersheds or for other protective purposes it is necessary that the timber should remain standing.

(b) Where as a reserve of timber for future supply it is necessary that cutting should be deferred.

(c) Where it is necessary to remove the timber in order to prevent the spread of insect depredations or injury from other causes.

5. Every State accepting the provisions of the Federal act should itself have enacted legislation:

(a) Which provides adequate fire laws with suitable penalties for violation thereof; and

(b) Which not only prohibits the violation of such rules and regulations as might be prescribed by the State and the Secretary of Agriculture in respect to the cutting of timber or the removal of any products thereof, and provides a penalty for such violation, but prohibits the shipment and sale of forest products manufactured from timber cut or worked in violation of such rules and regulations.

(c) Which establishes an adequate administrative machine for making the laws effective, and appropriates funds to meet the conditions of co-operation.

6. Federal participation should be based upon the precedent of co-operation with the States in policies of

education and development and upon the commerce clause of the Constitution. The Federal act should prohibit from interstate shipment any forest products cut or removed in violation of State law. (Ref. Act prohibiting shipment of intoxicants from wet into dry states.)

7. The State Forester, or other official with corresponding authority, should be charged with the responsibility of administering the law. He should be appointed to a position in the Forest Service in order to exercise the authority granted to the Secretary of Agriculture. The police powers of the State should be extended to the necessary Federal employes. Administrative supervision of the work should be exercised by the Forest Service.

8. The expenditure of Federal funds should be authorized on the basis of the Federal Government paying not to exceed one-half of the cost. The remaining half

would be paid by the States either from their general funds or from special funds raised by tax levies, such as the timberland tax in Maine, the severance tax in Louisiana, and the compulsory patrol tax in Washington and Oregon.

Any Federal funds which might be necessary for the purposes of compensation described in paragraph 4 should be carried in a companion act having in view primarily the acquisition of forest lands by the Federal Government.

9. In consideration of the Federal co-operation and aid offered under the plan, any State which accepts it will be urged to enact legislation that will relieve standing timber from burdensome taxes by placing a nominal tax on the land and deferring the tax on the timber until cut.

A DISCUSSION OF METHODS

BY R. S. KELLOGG

SECRETARY, NEWS PRINT SERVICE BUREAU

THERE is no doubt about the necessity for a national forest policy and that it should be speedily inaugurated if we are to have anywhere near adequate timber supplies in the not very distant future. I am heartily in accord with the discussion and the intention to keep the matter before the public until the way is paved for the beginning of the solution of the problem. Anything that I may say, therefore, is a criticism of methods and details and not as opposition to the general purposes, with which I am in sympathy.

After giving the matter very serious consideration, I am unable to approve most of the nine provisions set forth in Forester Graves' statement on the principles of legislation requiring the practice of forestry on private lands. I don't believe that it is either practical or expedient to compel the practice of forestry upon private lands through the interstate commerce provisions of the Constitution:

First, because as shown in a matter upon which there is so much public sentiment as that of child labor, the attempt to accomplish desirable reforms through indirect means has twice fallen down; and

Second, because a coercive program of this sort would immediately alienate and render hostile a large proportion of the timberland owners, thus demonstrating once more the statement made a long time ago by high authority that "forestry is practiced everywhere except in the woods."

In my judgment it is not practicable to line up all the timber states in the multitude of details that program of "mandatory forestry" requires. Even in the one single matter of forest taxation—concerning which foresters and timberland owners have been in substantial agreement—little progress has been made after years of agitation. How much longer will it take to make progress in matters in which foresters and timberland owners

are in opposition? As a matter of fact, we are now coming to see that the States are very loath to make tax concessions to any one enterprise or form of industry. and while I am in entire sympathy with the suggested changes in forest taxation, I still carry in the back of my head the idea that after all if forestry is a business proposition it must pay dividends under business conditions.

Politics always plays havoc with forestry. There would be no limit to the trouble that would result were forestry made compulsory upon the private owner through enactment and regulation by Congress and forty legislatures.

It seems to me that the time has come when the professional foresters of the United States should be frank enough to acknowledge what those who have had practical experience saw long ago, namely, that the growing of large sized timber of the ordinary commercial species is an operation too long in time, too hazardous in risk, and too low in rate of return to attract private capital, and that an attempt, national or State, to force private capital by legal enactment to engage in undertakings that are not profitable is doomed to failure. Forestry must be economically sound or it will not succeed.

My suggestions of constructive nature are:

First: A timber census and land classification to determine what we have in the way of present supplies and the areas which may be properly classified as affording opportunity for future and permanent supplies.

Second: A great enlargement and extension to all appropriate parts of the country of the purchase of cut-over lands, for which ample precedent has been established in the White Mountains and Southern Appalachians.

Third: Much more vigorous and general extension of Federal co-operation in fire prevention along the line of

the Weeks Law, coupled with such additional measures as may seem best in the different States to reduce the fire hazard and afford opportunity for natural reproduction. The States can go a long way in fire control and the mandatory principle can be applied here much more successfully than it can be applied to either cutting or reforestation operations on private lands.

Fourth: The acquirement of a reserve supply of merchantable timber in the West through the outright purchase of timberland financed by the issuing of timber

bonds or perhaps the carrying of a reserve supply in private ownership through some form of co-operation with the State and national governments.

I am just as strongly in favor of a great increase in the area of publicly owned timberland (national, State or municipal) and an increase in the scope and effectiveness of fire prevention measures as I am opposed to either Government operation of saw mills or the placing of compulsion upon the private owner to grow timber upon his land in case he is not so disposed.

PENNSYLVANIA'S OPINION

BY GEORGE H. WIRT

CHIEF FOREST FIRE WARDEN OF PENNSYLVANIA

"WE HAVE VISED THIS REPLY, APPROVE IT, AND HAVE DIRECTED THAT IT SHALL REPRESENT THE ATTITUDE OF THE PENNSYLVANIA DEPARTMENT OF FORESTRY."—ROBERT S. CONKLIN, COMMISSIONER OF FORESTRY.

THERE is no question in my mind as to the necessity for a national forestry program, and I see no reason why such a program should not be worked out immediately. This program should be preceded by a short and concise statement, setting forth just what is necessary to be accomplished in order to provide the economic factors which can be obtained only by a rational handling of the forest areas of the country, and reasons why these things must be provided for as indicated by the present demands for forest products and the present inability to have these demands satisfied.

Necessarily, the methods by which the end in view may be accomplished will differ in different states and in different forest regions. In the first place I believe that the most essential factor in the national program must continue to be the educational work. I cannot endorse your statement to the effect that the education of the last twenty years is practically without result. We have had forestry education in Pennsylvania since 1870, and I am convinced that the results are more than commensurate with the efforts put forth. If any fault is to be found it is with the lack of method, organization, and persistency in educational activities and with the inappropriateness and generality of the material used by national, state, association, and private forces.

My first suggestion, therefore, in the national program is for a co-operative scheme by reason of which the national, state, association, and private educational activities may be made effective and kept continuously so. The foresters of the country do not need to be persuaded, because of the facts which they have at hand and with which they are familiar. When the facts which we have are made common knowledge, there will be little or no question as to the outcome.

Along with the educational campaign, the state and nation must collect exact information in order to back up the claim for a continued forestry activity. We must have more complete and definite information as to the actual amount of timber available and the amount of timber growing or capable of being grown in the country. There must, also, be continued researches

which will lead to the conservation of present supplies and the bringing of wood growers and wood users together satisfactorily.

Both state and nation may continue as fast as their educational campaign will produce means, to extend public forests and to manage them properly. They must also recognize the community interest in the protection of forests and work out to the best possible advantage necessary means for helping the timber owners to protect the forests from fire and destructive agencies. The tax question also must be solved.

This leads directly to the matter of legislation. There must be some law, and, while it is possible in some cases to obtain satisfactory laws without the support of a public understanding the necessity for the law, yet such cases are rare and where such law is obtained its enforcement is very unsatisfactory. So in each part of a national program we are brought back to the necessity for an educational campaign, not for a short period of time but continuously.

I cannot say that I endorse a program which implies upon the part of the national government anything more than what may be necessary to assist the states to do their work satisfactorily. The present co-operation under the Weeks Law might be extended for the protection of forests from fire. I can see no reason for national legislation working to the control of timber cutting within the states, nor do I see any necessity for the national government spending money within any of the states in connection with farm woodlands, except that it might be specifically stated within an amendment to the Smith-Lever Act that the state colleges which receive national funds under this act must assist the farmers in the management of the same as a part of the general farm education required.

With respect to compensation of forest owners for what are distinctly protection forests, I would say that this ought to come under the forest purchase laws either of state or nation and such lands should be bought outright under the right of eminent domain, if necessary, without necessitating the review of private operations.

It strikes me that the plan to enter the various states under a co-operative agreement upon a fifty-fifty basis other than for educational purposes and for what may be distinctly of national value in the protection of streams affecting several states, is unwise.

I also consider it extremely unwise to create an organization such as would be created under item No. 7 of principles of legislation. Each state forestry association would necessarily be under obligations to the national officials.

It strikes me that the most important service the national government can render in the national program of forestry is to act as a clearing house for the various activities of the states and to keep all of the foresters informed as to national and local conditions, so that the officials of each state may have at hand information which may be of value in avoiding errors and in taking advantage of methods which have proved to be successful, and to continue such investigations as it is impossible for any state to continue by itself.

CONTROL OF GROWING FORESTS

BY ALFRED GASKILL, STATE FORESTER OF NEW JERSEY

BYOND all question there is need for serious consideration of the forest situation in this country.

Though that situation is in no essential way different from what it has been for years, the necessity for effective action is accentuated by the evidence, now clear to every observer, that there is an insufficient replacement of the waning store of timber in this country.

What should be done cannot be decided offhand, or by any man. A full discussion of the conditions, opportunities, and needs in each section of the country must precede the formulation of a policy.

A policy to be truly national must have in mind the necessities of the nation as a whole, yet with full recognition of the facts that the greater part of the forest lands in this country are in private possession and under state, not federal, control.

The discussion of the problem thus far has seemed to confuse the situation as represented by the stumpage holders, chiefly in the West and South, who are overloaded, and as represented by the public interest in growing, as distinguished from mature, forests. The first condition should be resolved by economic, chiefly financial, measures; the second demands the best thought of every forester, to the end that the next generation shall have enough lumber.

And I cannot agree with some foresters that the lumbermen have no interest in the question. That their interest is largely, or solely, financial is a fact, but present conditions must change radically before lumbering can become localized and permanent. So long as virgin timber remains it will be an attraction to exploiters, and I can see no escape from the conclusion that we must suffer the exploitation of most of our virgin stands before silviculture finds opportunity to take hold. I have never believed, and do not now believe, that for-

estry can play any large part in lumbering operations dealing with virgin timber.

The proposal lately made that forest owners be compelled to handle their properties under the advice of foresters is of doubtful wisdom. Desirable as it is to make the nation's stock of high grade lumber last longer than it now promises to last, there seems to be no argument to support the proposition that property interests in standing timber shall be sacrificed to a hope rather than a promise, much less a guarantee, that what is spared now can be realized on after a while.

If this view is radical it springs from a conviction that there must be a greater assurance than there now is in any part of the country that an investment in growing timber—not mature timber, is a safe investment. Before we can approach the owners of timber lands with any chance of securing results, before we can hope to impress legislatures and publicists with the reasonableness of our program, three things must be established; *first*, the fitness of a given area for continued use (through one rotation at least) as forest; *second*, security against destruction; and *third*, assurance of the total, or ultimate, tax levy.

The situation is critical but not hopeless by any means; a constructive policy probably can be based upon *encouragement* to woodland owners by the Federal Government and by the states; upon active *instruction and help* to the smaller woodland owners—similar to that furnished farmers; upon *fire protection*; and upon a modified tax practice; all of which will tend to establish an insurable interest in growing forests.

I emphasize the phrase "growing forests." To my mind the key of the situation is there—not in control over forests already mature, and which under every silvicultural law should fall to the ax as speedily as possible.

TO HELP in meeting war needs, the United States Forest Service in 1918 continued its efforts to secure full utilization of the forage resources of the National Forests. In 1917, because of the war, 23,000 more cattle and 71,000 more sheep were placed on the National Forests of California than had ever been grazed on them previously. In 1918 the numbers were still further increased by 18,000 cattle and 114,000 sheep.

THE tallest trees of the United States, says the *Canadian Forestry Journal*, are the California redwoods or the Douglas fir. Both claim the distinction of being the tallest, and it is an even match between them. A maximum of about 350 feet is the greatest, though a little more than that has been claimed. There is no question that in trunk diameter the redwood, that species known as sequoia, is the champion.

THE SEVENTEEN-YEAR LOCUST

BY DR. R. W. SHUFELDT, C. M. Z. S.

(PHOTOGRAPHS BY THE AUTHOR)

THE din created by the droning hum of an immense army of seventeen-year cicadas (they are not locusts, though generally called locusts) has been heard coming from the trees and bushes in many places during the past several weeks. The continuous hum of millions of these curious insects is heard throughout the entire day, from early morn until sun-down.

From the ninth to the twelfth of May, especially where there are mostly maples and oaks, there appeared perfect hosts of curious, dark amber-colored creatures that helplessly crawled about, each making an effort to reach something that it could creep up upon. Mingled with these were many "locusts" of the kind here shown in Figure 2. Thousands of the helpless horde were crushed underfoot. In some cities and towns the sidewalks were absolutely slippery with the mashed bodies of the victims, while hundreds of thousands of others had escaped this fate through climbing up on the trees,

fences, and other supports in their neighborhoods.

These "bugs" do not bite or sting, and they fall into a very interesting family of insects known as the *Cicadidae*, being popularly called locusts, cicadas, and sometimes harvest-flies. However, they must not be in any way confused with the various species of grasshopper-like insects that are the true locust, such as our American locust (*Schistocera americana*), or with those that during various periods of history formed the great flights in the Old World. Such phenomena are more or less fully described in some of the very oldest works we have, as the locust swarms of ancient Egypt. Many thoughtless people take our seventeen-year cicada to be identically the same species; and, too, as a rare occurrence, we still meet with some pious, old dame who shudders at the sight and sound of these harmless hordes, drawing a long breath when the "flight" is over and the people have escaped the punishment following upon some



Fig. 1. DRIED, EMPTY "SKINS" OF THE SEVENTEEN-YEAR CICADA, ATTACHED TO THE LEAVES AND FLOWERS OF THE MAPLE-LEAF VIBURNUM. THERE IS ONE PERFECT INSECT NEAR THE MIDDLE OF THE PICTURE. SLIGHTLY REDUCED.

willful misdemeanors of the nation. Of these cicadas there are a number of species, all looking very much alike, some being very large and some very small, with color in general agreement; their common appearance is well shown in the cuts illustrating this article. Several species are found in Europe and several still different kinds in the Americas. All true cicadas belong to the Order *Hemiptera*, and constitute the typical genus of the family *Cicadidæ*. All are of comparatively good size, the males having under their wings peculiar little "drums" wherewith they make the humming note so familiar to all, while the female has a most interesting history. She deposits her eggs from about the end of May through the entire month of June; these are discovered to be in pairs in the twigs of many kinds of oaks and other trees, and are very small, spindle-shaped objects.

In the case of this seventeen-year cicada, the larvæ hatch out in about six weeks from the time the female lays the eggs; they then immediately fall to the ground, into which they burrow, to spend the next seventeen years of their lives, remaining only a few days in the pupa stage. During all this time, their only food consists of the juices of the roots of certain trees, they being provided with the means of sucking the roots.

It has been shown that the female is quite indifferent to the kind of tree, shrub, or brush into the twigs of which she deposits her eggs. Often much harm is thus done to fruit trees, such as the apple and pear; and so severe is the treatment sometimes and the number of punctures sustained, that the death of the tree follows. Peach trees have been thus destroyed, proving the cicada to be, in many instances, a harmful insect. When cherry trees are selected, the exuding gum usually seals in the egg or young, and they never come to anything. Some females show wonderful fecundity, the line of minute

punctures for the eggs on the twig often having a length of more than two feet.

At the time these cicadas laid their eggs in the grooves they cut in certain trees, along towards the middle of June, the effects very soon became apparent. Especially was this true in the case of all the species of oaks, chestnut oaks, and sassafras shrubs. The big twigs thus operated upon by the insect had all the leaves beyond the line of punctures die and turn a deep tan color. Some large oaks thus wounded presented a mottled appearance at a little distance, the general body of the tree retaining its normal dark green foliage, with the dead, brown patches irregularly distributed all over it. In general, the tree sustained no other injury.

Mr. S. S. Rathvor, of Lancaster, Pennsylvania, gives interesting facts in the life history of these cicadas saying, in part, referring to the eggs and young of the seventeen-year Cicada; "many people who endeavor to study the insect fail to produce the young by keeping branches containing eggs in their studios. I so failed in 1834 and 1851, and indeed I have never heard that any one has suc-



Fig. 2. SEVENTEEN-YEAR CICADAS, WITH ONE EMPTY SKIN-CASE. WASHINGTON SPECIMENS OF 1919, FROM LIFE AND NATURAL SIZE. NOTE THE DISPOSITION TO ADVANCE THE FORE-PAIR OF LEGS.

ceeded in that way who has kept them for any length of time. In the brood of 1868 the first Cicadas appeared in a body, on the evening of the second day of June. The first pair *in coitu* I observed on the 21st, and the first female depositing on the 26th of the same month. The first young appeared on the 5th of August. All these dates are some ten days later than corresponding observations made by myself and others in former years.

"On the 15th of July, I cut off some apple, pear, and chestnut twigs containing eggs, stuck the ends into a bottle containing water, and set it in a broad, shallow dish also filled with water, the whole remaining out of doors exposed to the weather, whatever it might be. The young continued to drop out on the water in the dish

for a full week. I could breed no Cicadas from branches that were dead and on which the leaves were withered, nor from those that from any cause had fallen to the ground; this was also the case with Mr. Vincent Bernard, of Kennet Square, Chester County, Pennsylvania. After the precise time was known, fresh branches were obtained, and then the young Cicadas were seen coming forth in great numbers by half a dozen observers in this country. As the fruitful eggs were at least a third larger than they were when first deposited, I infer that they require the moisture contained in living wood to preserve their vitality. When the proper time arrives and the proper conditions are preserved, they are easily bred, and indeed I have seen them evolve on the palm of my hand. The eyes of the young Cicadas are seen through the egg-skin before it is broken."

Some thirty-five years ago, the late Professor Charles Valentine Riley, an entomologist of great distinction, published an excellent cut, giving an upper view of a seventeen-year cicada, with its wings spread; two views of the pupa; a twig showing the position of the eggs, and a larva. They were all the size of nature, and the illustrations appeared later on in many kinds of publications; but for some reason the figure of the larva was omitted—perhaps for the reason that it was not quite accurate.

The writer believes it was Professor Riley who first discovered that there was in the South a thirteen-year cicada; he always believed that the seventeen-year broods were northern and the thirteen-year ones southern—the dividing line being at the thirty-eighth degree of latitude, approximately, overlaps taking place at certain points. He predicted accurately the probable emergences for certain years, and the insects did not fail him but put in an appearance in millions on schedule time.

Professor Riley pointed out that the development of the larva is extremely slow, being not more than one-fourth its full size when six years old. As it moults more than once a year, there must be some twenty-five or thirty changes of its skin when in its subterranean abode, which is not over two feet below ground during the first six or seven years of its existence. At this time it is in an oval cell which Professor Riley showed was more often away from roots than near them. Packard states: "Yet it can descend to great depths, one writer stating that he found it 20 feet below the surface. As the time approaches for the issuing of the pupa, it gradually rises nearer and nearer to the surface, and, for a year or two before the appearance of any given brood, this pupa may be dug up within one or two feet of the surface."

During the present invasion of these insects, the round holes where these cicadid nymphs came out were extremely numerous around many trees and in pathways through the woods. Upon several occasions, when turning over fallen logs, the writer discovered the pupa had made a chimney closely resembling the corresponding achievement of the common crayfish; this has been noticed by other observers. Out at Linden, Maryland,

the twigs of the lower limbs of hickories, oaks, and maple-leaved viburnums were seen to be literally covered with the empty cases of the nymphs or pupæ of this cicada (Fig. 1). They also covered small cedars not over two feet in height, as well as many bushes. This was upon the 25th of May, 1919. A few of the perfected insects were distributed through these interesting and very striking groups, and the "music" of the latter had

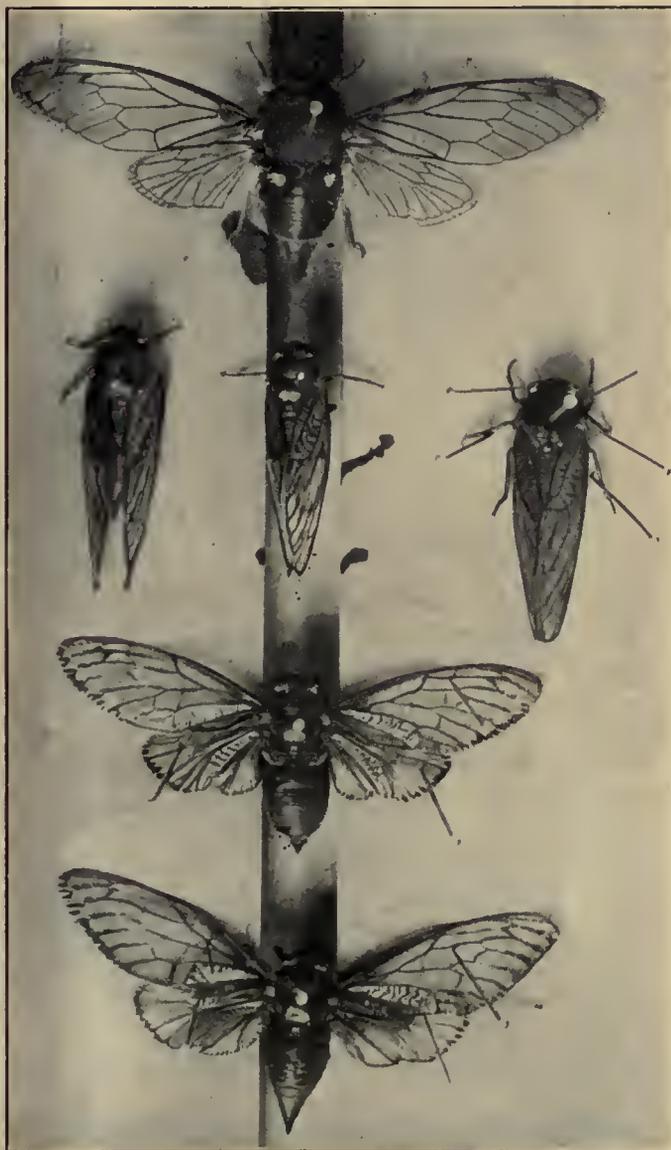


Fig. 3. DEAD CICADAS PINNED OUT ON A "SPREADING BOARD" FOR PRESERVATION IN A COLLECTION. THE LARGE UPPER ONE IS THE COMMON FORM OR "HARVEST-FLY" OF THE EAST. NATURAL SIZE. WASHINGTON SPECIMENS, COLLECTED BY THE AUTHOR (1919).

just begun in the trees and shrubbery the day before.

What strikes us first upon looking at one of these seventeen-year cicadas, when it is alive and in full health, is its beautiful coral-red eyes, set off by its dark greenish-black body. All about the base of its wings and costal margins of the same, the color is of a deep, rich, and very brilliant orange. The sexes are distinguished by the presence of the ovipositor in the female, which is quite conspicuous.

While this emergence was on, the writer collected over an hundred of these cicadas, with as many pupæ

and empty cases. They were carefully studied and also used for photography, the illustrations accompanying this article being made especially for it.

The nymphs dig out of the ground through the use of their strong and enlarged fore-feet, the matured insect subsequently emerging from a slit down the back. All of this is seen in Figure 1 through carefully regarding the several specimens. Sometimes we meet with cases where the insect died when only partly out of the case. In still others the wings crumple up, and the helpless insects crawl about on the ground. Probably there are also other kinds of deformities.

In flight, the seventeen-year cicada is not at all rapid, nor is that flight, as a rule, long sustained. Most often it is in a straight line or on a long curve, either ascending or descending. They are very loath to move in a rain-storm, or when wet from any cause. There is no trouble in catching the adult insects, and when held in the fingers they commonly emit a loud, humming noise; should the wings be free to move at such times, they whirl them rapidly, thus adding to the fuss they make. On even ground, this cicada walks with great deliberation, bringing the fore-pair of legs to the front with marked cicadian dignity at regular intervals. Frequently, when on the ground, one may get over on its back, when it will violently whirl its wings in its efforts to right itself again. In warm, dry weather they are far more active than when the air is chilly and damp.

When observing children capture these "locusts" they will call your attention to the W near the upper, outer angle of each fore-wing and with a dubious shake of their heads predict that a war is near at hand. This is backed up by inviting attention to the reddish color on the wings of our larger species of cicada, where this ominous W is also to be seen. As the *Cicadidæ* have been in existence for a great many thousands of years, during which time millions of men have been slain in wars, this harmless superstition is hardly worthy of a smile. Strange to relate, however, we have many "grown-ups" among us who are firm believers in this and similar "signs."

This family of *Cicadidæ* contains many other species besides the thirteen-year and seventeen-year ones; a larger one of the eastern United States is well known. It comes along during the "dog days" of summer or a little later, and its "song" is indicative of the approach of early autumn. Rarely do we hear more than one or

two of these together—in cities usually from the shade trees along the streets. The "song" has a definite beginning and ending, and is not a continuous hum as is the case with the seventeen-year fellow.

There are a number of tropical species; and out West a very cute little form, much lighter in color, that the writer has observed in thousands on the sage brush on the prairies. This probably is the one that Dr. Frank E. Lutz refers to in his work, a *Fieldbook of Insects*, when he says: "Of the genus *Cicada* (as now limited, *Tettigia*), the small *hieroglyphica* (Plate XXII.), with an almost transparent abdomen, may be found in pine barrens, and is our only species." (P. 84.)

Kirby, in his *Text-Book of Entomology*, figures *Thopha saccata*, Amyot, and says that it is an Australian insect, remarkable for the large drums of the male. It is rusty

brown; the thorax is banded with black and yellow, and the abdomen is black." From tip to tip, this giant among the *Cicadidæ* measures five and a half inches.

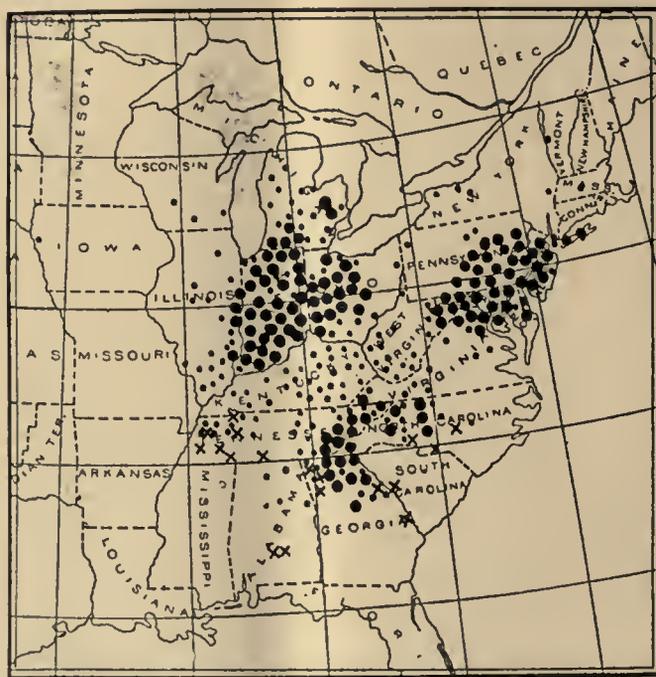
Three very fine species inhabit China, and others are found in South Africa. The big one of the East Indies (*Dundubia imperatoria* Westw.) measures over eight inches across the spread wings!

Kirby remarks that the "Cicadas are improperly called "locusts" both in America and Australia. In countries where they abound, the larger species keep up a perpetual chirping, and they and other insects make the woods resound with their song at almost all hours of the day

and night. Hence, I have been assured by travellers who have spent some years in the Tropics, that nothing struck them so much on their return to England as what seemed the death-like stillness of our woods, and that it was months, or even years, before they were able to divest themselves of the impression that it was always winter." Were such travelers able to hear the din created by the thousands of the seventeen-year cicadas "singing" in concert in the trees, they would most assuredly have but slender grounds for such complaint.

One of the very best accounts of our cicadas is given us by Dr. L. O. Howard, in his well-known *Insect Book*, fully illustrated by many of Riley's excellent cuts. These last include the "young larva" of the seventeen-year species, which stands in evidence of Doctor Howard's belief in its accuracy.

"The ultimate fate of this interesting species," says this eminent authority, "is undoubtedly extinction, and its



MAP SHOWING THE "HOSTESS" STATES—TERRITORY IN WHICH THE PERIODICAL CICADA (LOCUST) APPEARED IN 1919. LARGE DOTS INDICATE DENSE AND SMALL DOTS SCATTERING COLONIES.

numbers are rapidly growing less. One of the comparatively few insects upon which the English sparrow feeds with avidity is the periodical cicada, and many thousands of them are destroyed by sparrows each time they make their appearance and before they lay their eggs." One interested in cicadas should certainly read this valuable account by Doctor Howard. According to Lutz, the adults live only a week or so, "to recompense them for the long period of preparation."

Further on the same author remarks that "there are a score, or more, of different broods, each of which has a rather definite—often restricted—distribution and time of emergence. Suppose there are three such broods in your neighborhood. One of them (that is, the adults) may have appeared in 1911; its next appearance would be 1928. Another might be 1916, 1933, and so on. As a matter of fact, these are actual broods, although they may not be the ones of your neighborhood. However, the example shows that we may have seventeen-year cicadas oftener than every seventeen years, to say nothing of the possibility of laggards or extra-spry individuals, in various broods, which do not appear on schedule time."

It has been pointed out that many thousands of these cicadas came forth on the streets in Washington. This,

be it noted, could only happen where the ground, for seventeen years or a little more, had not been sealed over, either by some structure or other having been erected upon it, or by the making of cemented sidewalks and impenetrable roadways. As Washington very extensively encroached upon its former environs during the time this brood of cicadas were enjoying the seventeen years of subterranean existence, many hundreds of acres being sealed over, it is apparent that all the cicadas in those areas perhaps millions of them, could not come to the surface at the appointed time, and thus perished at the points where they arrived at such impassable barriers. It is claimed that this factor of destruction will, in time, exterminate this interesting insect—an idea that surely is quite unbelievable; though to a certain extent it may keep their numbers down, as does the extensive warfare waged upon them by the "English Sparrows" in and about our cities.

Extinction or no extinction; war or no war; sparrows or no sparrows—in the month of May, 1936, common reckoning, we shall, with absolute certainty, see an emergence of our seventeen-year cicada where the present hordes have appeared.

DR. FERNOW, DEAN OF FORESTERS, RETIRES

DR. B. E. FERNOW, Dean of the Faculty of Forestry, University of Toronto, retired on July 1. Dr. Fernow intends to return to the United States and, if his health permits, to continue his labors in authorship which have already won him much distinction. The success of the College of Forestry at Toronto mirrors Dr. Fernow's unsparing giving of himself for the advancement of the science of forestry in Canada. One cannot over-emphasize the discouragements he met and overcame in founding a new and unfamiliar branch of technical training, the youngest of the engineering professions. As a Director of the Canadian Forestry Association, Dr. Fernow was a great believer in educational propaganda and assisted it at every opportunity.

He became Chief of the Division of Forestry, United States Department of Agriculture, in 1886, a position which he filled until 1898. In addition to his official work, he was a constant promoter of all biological investigations leading to a broader understanding of the principles of forestry. In 1883 he was elected secretary of the American Forestry Association, and also held the position of chairman of the Executive Committee, and finally first vice-president of that organization. The degree of Doctor of Laws was conferred on Dr. Fernow by the University of Wisconsin in 1897. He took up his duties at Toronto University in 1907.

HOMES built of wood were practically the only structures unscathed in the severe earthquakes which devastated parts of the island of Porto Rico, according to reports made to the National Lumber Manufacturers' Association—a high tribute to the durability of this forest product in building work.

DOUGLASS "KILLED IN ACTION"

A REPORT from the Adjutant General practically confirming the death of Lieut. C. W. H. Douglass reads as follows:

"Lieut. Charles W. H. Douglass, Signal Corps, previously reported missing in action since June 11, 1918, now reported killed in action, same date." No further details are available.

Lieutenant Douglass was a graduate of the New York State College of Forestry and at the time of his enlistment in the Aviation Service, was associated with P. S. Ridsdale, editor and secretary of the American Forestry Association. His loss is keenly felt.

GRADUATES OF THE NEW YORK STATE COLLEGE OF FORESTRY GRANTED AMERICAN-SCANDINAVIAN FELLOWSHIP

MR. HENRY M. MELONEY, of Bordentown, New Jersey, who was graduated from the New York State College of Forestry, at Syracuse University, with the degree of B. S., in June, 1918, has just accepted appointment to a technical fellowship for the study of forestry, lumber, and paper and pulp manufacture in Sweden, under the American-Scandinavian Foundation. Ten college and university men from America will be sent to the Scandinavian states under the American-Scandinavian Foundation for study and research. Two of these fellowships are in forestry and the others in mining, electrical engineering, etc. The fellowships carry \$1,000 and are of one year's duration. Mr. Meloney is planning to leave for Sweden in August and will specialize in lumbering and logging engineering.

Forestry for Boys and Girls

by E. G. Cheyney

THE PINE WOODS FOLK

SQUEAKY FINDS TWO MORE VANDALS



SQUEAKY liked to gossip about as well as anyone and he did a good deal of it when he had a chance, but there was nothing lazy about him. When there was any work to do he settled right down to business and finished the job. So when Mrs. Squeaky told him that she had located a big supply of acorns he was as anxious as she to transfer them to their store room.

"Where are they?" he asked as they bobbed off through the woods together.

"In the old hollow maple stub, right on the ground."

Squeaky stopped very suddenly and looked at her with doubt in his eye. "But Johnny Woodmouse lives there," he exclaimed.

"No, he doesn't," Mrs. Squeaky replied, proud of her news. "Porky told me this morning that Mrs. Woodmouse went out on the snow one night last winter and the owl caught her."

"But he did not catch Johnny and the children?" he asked, still hesitating.

"No, but Johnny left as soon as the snow melted, to look for another wife, and he took the children with him. They have been gone six weeks."

Squeaky no longer hesitated. He raced along with his smart little wife to the old maple stump. She disappeared between two of the big roots and he found a small hole between them that led into the big hollow stump. There must have been a bushel of acorns on the floor of the hollow.

"I did not even know that there was a ground hole into this stump," Squeaky exclaimed admiringly.

"I found a tiny little hole there in the rotten wood," Mrs. Squeaky explained proudly, "and dug it out. You see, the acorns came from up there."

Squeaky looked up and saw a small hole leading into the hollow above where Johnny Woodmouse had lived. All the acorns had run down through this hole. They started to work at once. With an acorn in each cheek and another in his teeth, Squeaky started out, but

he could not make it. He had to take an acorn out of one cheek before he could get through the hole. He made a great fuss about it, but finally went on with the two acorns. While he was gone Mrs. Squeaky, who was of a more practical turn of mind, cut the hole a little larger so that her packed cheeks would go through.

Squeaky was on his second trip when he saw a junco hopping along apparently picking something out of the air every little while. Squeaky's curiosity was aroused at once. What was the junco eating? He went over that way and found that the junco was picking the seed caps off of the tiny little pine seedlings and taking the top off of the seedlings with them. Squeaky was very much excited, but he could not talk with his mouth so full. As it was against his principles to lay down a load, he hurried home with it as fast as he could go and tore back to the junco.

"Hey," he called as soon as he was within earshot, "do you know that those are pine seeds that you are eating?"

The junco looked a little disgusted. "I thought they tasted like them," he replied.

"Well, that's what they are," Squeaky cried. "They stick on top of the seedling when it comes out of the ground. Every time you pull off one of those you pull off the top of the seedling with it and kill it. We shall never have any pine trees if you go around everywhere doing that."

The junco looked at him curiously. "You eat the seed, don't you?" he asked.

"Certainly," said Squeaky, "but—"

"Well, then," said the junco as he flew away to another patch of seedlings.

Squeaky was almost stunned. He had already scolded Porky, Cottontail and the junco for destroying pine trees and now he had suddenly discovered that he had probably kept more pine trees from growing than any of them. Probably had destroyed more than anybody else, except Chatter Box.

It made Squeaky very thoughtful, but it did not stop him from hurrying on to help Mrs. Squeaky, and by evening the whole bushel of acorns was safe in their store house.

THE GULLS AND TERNS

(Family Laridae)

BY A. A. ALLEN

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

TO THOSE who go down to the sea, there is no bird more familiar than the sea gull. It matters not that there are fifty different kinds of gulls in the world with as many different names. All of the long winged graceful white birds that follow the ships the world over, or congregate in large flocks in the harbors, are everywhere called sea gulls and always will be. Absolute masters of the air they are, for no storm is so severe that they cannot still be seen, now circling

with scarcely a mark of any kind. Immature gulls are uniformly darker than the adults, being dusky or grayish, changing gradually during the first two or three years to the plumage of the old birds.

Gulls vary in size from that of a pigeon to that of an eagle although they are always more slender than the latter. As a group they are larger than the terns though a few of the terns are larger than the smallest gulls. The majority of terns are about the size of slender



Photograph by Herbert K. Job

AN AVIAN SNOW STORM

Royal and Cabot's terns nesting. Breton Island Reservation, Louisiana.

high overhead, now gliding close to the waves, now sailing apparently straight into the wind without a movement of the wings. Sometimes they sail for hours by the stern of the ship taking advantage of the air currents and never moving their wings except to alter occasionally the angle at which they are held. Again they are seen tossing about on the waves for they have webbed feet and can swim like ducks.

The majority of gulls are pure white except for pearl gray mantles and black tips to the wings, but some have the mantle darker, others have the head black during the summer, while still others have the entire plumage white

pigeons but some are not much larger than the largest swallows. Indeed they are sometimes called "sea swallows" because of their long pointed wings, deeply forked tails, and light, airy flight.

Terns do not often sail like the gulls but few birds excel them for gracefulness. With measured strokes of the wings, almost suggestive of the motion of a butterfly, and with their bills directed downward as they watch the water, they beat back and forth along the coast hunting for small fish. Once a flock of terns locates a school of fish, a scene of intense animation follows. The buoyant, rhythmic flight gives way to a series of daring plunges

and they dart from a considerable height into the sea, spearing the small fish with their pointed bills. In this method of feeding they differ entirely from the gulls which have hooked bills and feed upon dead fish that they find floating on the surface.

Gulls and terns are much alike in their nesting habits for the majority of species build crude nests or lay their eggs in simple depressions in the sand or on the rocks, with little or no pretense at nest building. In this respect and also in their eggs, which are olive or drab in ground color, rather heavily marked and sharply pointed, they are quite similar to the sandpipers and plovers. Indeed they resemble the shorebirds in other respects and in many anatomical characters as well so that most ornithologists today put all of them together in one major group or order.



Photograph by G. A. Bailey

A TERN POST

A black tern in full plumage. In this plumage it belies its name.

and larger bodies of water that do not freeze over, and whenever the ground is not covered with snow, they make sorties to the uplands, often long distances from water, where they find grasshoppers, beetles, and grubs. Gulls always roost on the water, however, so toward night they can



Photograph by G. A. Bailey

CAMOUFLAGE IN NATURE

Young gulls and terns are almost impossible to see against the lichen covered rock. Here are three young herring gulls.



Photograph by G. A. Bailey

THE BLACK TERN IN SUMMER

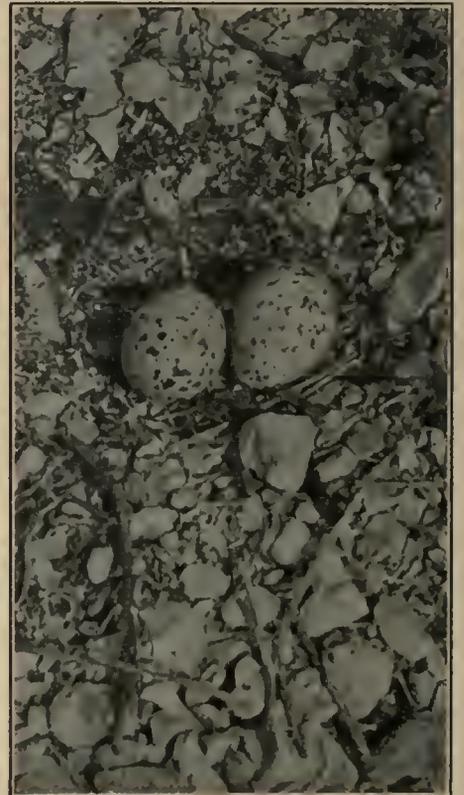
In this plumage the head and underparts are black—an unusual plumage for this family of birds.

The commonest and best known of the twenty-five species of gulls found in North America is the herring gull. It is found throughout the northern hemisphere, nesting from northern United States and northern France northward, and wintering from the southern part of its breeding range south to the Gulf of Mexico and the Med-

iterranean. It is common in winter in New York harbor and in other harbors, following the ferries and swooping down to pick up pieces of bread or refuse thrown into the water. It follows also the garbage scows in dense clouds and is everywhere a valuable scavenger. In the interior the herring gulls are common on all of the Great Lakes

and be seen returning to the lake just as they left it in the morning. While on the lake, in addition to picking up dead fish, they occasionally rob the loons and mergansers. Sometimes a dozen or more gulls hover over the spot where these birds are

fishing waiting for one of them to make a catch, and then they will swoop down at it before it has time to swallow its prey. Usually the gulls are so persistent that the diver finally drops the fish, and the gulls fall upon it and begin fighting among themselves. The herring gulls



Photograph by G. A. Bailey

A SIMPLE HOME

The gulls build crude nests and the terns usually none. This is the nest of a Caspian tern on an island in Georgian Bay.



Photograph by Herbert K. Job

"AN OFF HOUR FOR HOUSEKEEPERS"

Laughing gulls, Breton Island Reservation, Louisiana.

usually select a rocky island for a nesting site and pull together small piles of drift weed for nests. They usually lay three eggs which vary from drab to olive or bluish white in ground color, irregularly spotted with lilac and shades of brown. The young birds are covered with down when hatched, and, like the adults, are able to swim. They are cared for by their parents, however, until they learn to fly. Their downy coat is mottled with buff and gray so that when they crouch they are almost invisible against the lichen covered rocks.

A somewhat smaller and more migratory species is the ring-billed gull which scarcely can be distinguished from the herring gull at any distance. It migrates as far south as Mexico and Central America and rarely winters as far north as New York State. The chief difference between it and the herring gull is that in the adult plumage, it has yellow legs instead of pink and has a black band across its bill. The immature birds can be distinguished at greater distances because the ring-billed gull has a pure white tail marked by a subterminal black band while the immature herring gull has half or all of the tail dark.

A somewhat smaller and more maritime species is the kittiwake, so called from its note. It has nearly the same pattern of coloration as the herring and ring-billed gulls with more or less black on the flight quills. Three larger species, the glaucous gull,

the Iceland gull, and the Kumlien gull are distinguished by the absence of black on the primaries. These are northern species found rarely on our coast in winter and they can be distinguished from one another only by experienced observers. A more distinctly marked large gull, in fact the largest of them all, is the great black-backed gull which differs from all the others in having the mantle a deep slaty black. It is a maritime species and seldom visits inland waters.

The smallest of the North American gulls is the Bonaparte's gull which in its breeding dress has the entire head slaty black. It takes at least two years to acquire this plumage, however,

and it is worn only during the summer so that white headed birds are much more often seen. It is more migratory than the other species, nesting in the far north and seldom wintering north of the Southern States, many individuals continuing their winter roving to Mexico and Yucatan.

A more southern black-headed gull is the laughing gull which nests in the salt marshes along the coast from Massachusetts south to Venezuela, retiring in winter to the Gulf coast and even to Brazil. This denizen of the South is somewhat smaller than the ringed-billed



Photograph by Herbert K. Job

THE GREATEST OF ALL TRAVELERS

Arctic tern on nest. This bird is said to migrate 22,000 miles a year. Matinicus Rock, Maine.



Photograph by Herbert K. Job

ON THE SEA CLIFFS

Kittiwakes, nesting on Great Bird Rock, Magdalena Islands.

gull but considerably larger than the Bonaparte's.

In the Mississippi valley and west to the Rockies there is a very similar black headed species called the Franklyn's gull. It is the least maritime of all the gulls, reaching the sea coast only during its winter quarters, which stretch from Louisiana to Peru and Chili. During the summer it frequents the prairie country feeding principally upon locusts and other insects, often following the plowman for the grubs that are turned up by the plough. It is this species that the Mormons believe saved their first settlers from starvation by consuming the black crickets which threatened to destroy all their crops. Indeed they have recently erected an elaborate fountain and monument in Salt Lake City dedicated "to the gulls which saved the early settlers from starvation."

Along the Pacific coast there are three common species, the glaucous-winged, the western, and the California gulls, which are not found in the east. They are white-headed species, not strikingly different from the herring gull.

Ten of the fifty species of terns known to science are found

in North America. They are easily distinguished from the gulls by the points already mentioned but many of the species are distinguished from one another only by the closest observation. The commonest color pattern is similar to that of the gulls being largely white with pearl gray mantles, but in the breeding season all the typical species have the whole top of the head black. Most of



Photograph by Herbert K. Job

AN UNUSUAL PERCH FOR A GULL

Herring gull solicitous for its nest, Matinicus Island, Maine.

them, likewise, have deeply forked tails. They vary in size from the least tern which is not much larger than a swallow, to the royal and caspian terns which are about



Photograph by Herbert K. Job

LIKE A MANTLE OF SNOW

Royal and Cabot's terns nesting, Breton Island Reservation, Louisiana.

the size of ringed-billed gulls. The caspian tern is a somewhat larger species than the royal and has a less deeply forked tail. It is likewise more northern in its distribution. The common tern (or Wilson's tern), the Forester's tern, the Arctic tern, and the roseate tern are all much alike being about fifteen inches long and having the typical tern coloration. They are, however, somewhat different in habits and distribution, the common tern being the most widespread and generally seen. Close observation will distinguish the Arctic tern by its grayer underparts and uniformly deep red bill, the common tern by its white throat and grayish breast, and bill, red only at the base. The Forester's tern can be distinguished by its pure white underparts and dull orange bill and the roseate tern by its delicate tint of pink on the underparts.

The Arctic tern is the most maritime of them all and is said to have the longest migration of any bird, some individuals nesting well within the Arctic Circle and some wintering well within the Antarctic, requiring an annual pilgrimage of about 22 thousand miles. The Forester's tern is more of a western species and is more marsh loving than the others, nesting in grassy marshes. The common and roseate often nest together on some of the islands off the Atlantic coast but the roseate is more southern of the two extending its breeding range to northern South America. The gull-billed tern is a nearly cosmopolitan bird but is found in North America only as far north as Virginia. It is quite easily identified by its short heavy bill and less deeply forked tail.

The least maritime of all the terns is the black tern which frequents the marshes of the interior. It is easily distinguished in its breeding dress by its black head and underparts but during the winter these are white and it is not so different from the other terns except that its upperparts are darker.

There are two tropical terns, the sooty tern and the noddy tern which are common on the Florida keys and some of the islands off the Gulf coast where they nest in colonies of thousands. The sooty tern can be distinguished from other terns by its black upperparts and the noddy tern by its black underparts, as well as upperparts, only the top of the head being white.

In the days when the feather trade was at its height, thousands of tern skins of all species were shipped to the New York markets and the breeding colonies all along the Atlantic coast were almost wiped out. Indeed even after some of the nesting islands were set aside as refuges and protected by wardens, hunters congregated in boats near the islands and baited the birds up to them. In this way they were still able to kill hundreds of them because the terns have the unfortunate habit of hovering over a wounded companion and returning again and again, even though shot at, as though they would succor him. It was not until through the efforts of the National Association of Audubon Societies and a few far-sighted Senators and Congressmen that the non-sale of plumage laws were passed. These laws forbade the sale of the plumage of native birds, and made it possible to save

the few remaining terns. Now the birds are beginning to increase and to nest where they have not been found for years. The least tern alone, seems unable to recuperate from the verge of extermination to which it was forced and it is still a rare bird all along the Atlantic coast where once it was extremely abundant.

CITY TREE PLANTING

ALDO LEOPOLD, secretary of the Chamber of Commerce at Albuquerque, New Mexico, tells how that city conducted a tree planting campaign which offers valuable suggestions to other commercial organizations. The first step was to appoint a committee of private citizens experienced in tree planting. This committee drew up a set of specifications embodying the consensus of their opinions as to the best species of trees to plant and when, the best size of stock, and the exact methods of shipment, storage, distribution, planting, and the after care which is necessary to produce the best results under the conditions existing in Albuquerque. The specifications were then published in the local newspapers, and private parties were asked to submit bids, giving the cost per tree for which they would agree to meet the specifications. On a given date all bids were reviewed by the committee, and those bidders whose prices were reasonable were investigated as to their personal reliability and experience and the reliability of the nursery with which they did business. Certificates of recommendation were then issued to all the bidders who, in the opinion of the committee, were fully qualified to do the work.

The committee then appointed a trained forester as inspector. The certificates of recommendation stipulated that any work not complying with the specifications as interpreted by the inspector would result in the forfeiture of the certificate of recommendation. All holders of certificates were then encouraged to proceed to solicit business in the regular manner of private contractors.

These certified contractors commanded the confidence of the public and were aided by an extensive advertising campaign. This was conducted by the Chamber of Commerce with the full co-operation of the local newspapers. Large numbers of trees were ordered by property owners who had in former years deferred tree planting because they were not satisfied with the service rendered by unregulated contractors. A total of over one thousand trees were planted, and so far 95 per cent of them are growing and doing well. Under the extremely difficult conditions obtaining in the Southwest, this is a very exceptional showing. The public is well satisfied. The annual planting of trees will be at least trebled, and the contractors state that they will never work under any other system.

A FOREST FIRE IS A REAL ENEMY

Carelessness causes many fires. Are you careless? Never leave your camp fire without making sure it is completely out. We won the war to defend Democracy. Must we now fight forest fires? Are you careful with fire in the forest? Burning matches cause fires. Break your match in two before throwing it away. If you discover a forest fire, put it out.

EDITORS TAKE UP FOREST MATTERS

NEWSPAPERS ANSWER CALL OF AMERICAN FORESTRY ASSOCIATION
AND OPEN COLUMNS TO DISCUSSION OF BIG QUESTIONS

ANATIONAL forest policy for the United States, "Roads of Remembrance," plans for reforestation in France, Belgium and Great Britain, and the planting of Memorial Trees, for all of which the American Forestry Association is campaigning, have received the hearty indorsement of the editors of the country.

In an editorial on beautifying the roads of the country the *Atlanta Constitution* outlines the suggestion of the American Forestry Association and says, "This is an excellent idea. The movement in all its phases is commendable and it is one to which the public should give hearty indorsement." The Association urges that County Units plan memorials of various kinds with the good roads in mind so the memorials be easy of access and that the roads for which millions are to be spent be marked with memorial trees. "The advantages of having highways set with trees are a great many," says the *Worcester, Massachusetts, Gazette*, "and few undertakings of so small comparative cost are calculated to give as big a return for the money invested as the planting of trees along the highways wherever such work is practicable."

Fruit trees are advocated for roadside planting by the *Portland Oregonian*, and so are nut trees. "This is an established custom in Europe," the *Oregonian* points out, "and a practice worth thinking about." The *Pittsburgh Post* praises the Boy Scouts for planting walnut trees and adds:

"This is particularly timely in view of the warning just issued by the American Forestry Association that the country faces a timber shortage." The *Columbus, Ohio, Dispatch* says: "If the people of this country do not begin planting black walnuts they will make the mistake of their lives." The "*Haskin Letter*," a feature used by many newspapers, carries a column on "Roads of Remembrance," pointing to the opportunity to beautify the country and at the same time impress the need of a national forest policy. The *Washington Times* and the *Washington Herald* give generous space to the article and the *Washington Star* uses nearly a column in telling of the Association's suggestion for tree planting along the drive to connect two of Washington's famous parks. Dr. Frank Crane, in his daily editorial, used by about

one hundred of the biggest newspapers, indorses the Association's Memorial Tree campaign.

In an editorial, "Trees as Memorials," the *Boston Post* says: "The sentiment is one which appeals directly and strongly to the heart of our people. The American Forestry Association is aiding the governments of Great Britain, France and Belgium in their schemes for repairing the forest devastation wrought by the Hun and compelled by their own military needs. To restore and beautify the world for which our boys fought and sacrificed so bravely is their best and most enduring monument." The *London Mail*, speaking of the ravaged forests, says: "England in one regard looks strangely like those parts of Belgium where the Germans have resided. You see wherever you go acres of sawdust chips in place of vanished forests." The *Mail* then goes on to give the plans of Mr. Acland, of the Woods and Forest Department. Under the heading "Trees for France," the *Goshen, Indiana, Democrat* says: "It is a practical suggestion.

America can send almost any desired variety of tree or shrub." The *Indianapolis Star* points to "a recent survey of the forests in France by the secretary of the American Forestry Association," and adds that "the situation presents a tremendous problem not only for the nations involved but for other countries as well." "America's natural resources have been the salvation of Eu-

CALL TO MEMBERS

Enlist for service with YOUR ASSOCIATION. The need of a national forest policy will be doubly impressed upon the editor of your paper if you point out this need to him. Write a short statement of facts, sign your name as a "member of American Forestry Association," and send the copy to the editor of your newspaper.

Discuss local park and tree situations with the editor for he wants to know the public opinion and values it highly. Where trees need attention tell him and you will find ready response, for the editors of the country are keen to help.

rope," is the way the *Boston Globe* puts it, while the *Buffalo Evening News* quotes the figures from the *American Forestry Magazine* to show the need of increased planting. The *Baltimore Sun*, *Minneapolis Journal*, *New York Times* and many other papers quote the magazine for a column on the destruction of the forests in the battle areas. The *Dayton Herald* quotes the Association's "Don'ts" for forest fires and points to the need of a national forest policy, saying, "Only the United States lags." The *San Francisco Examiner* uses an eight column box across the top of the first page on a telegram of congratulation to San Francisco upon the dedication of its Hero Grove. These are but examples of the way the editors of the country are co-operating in the drive for a national forest policy.

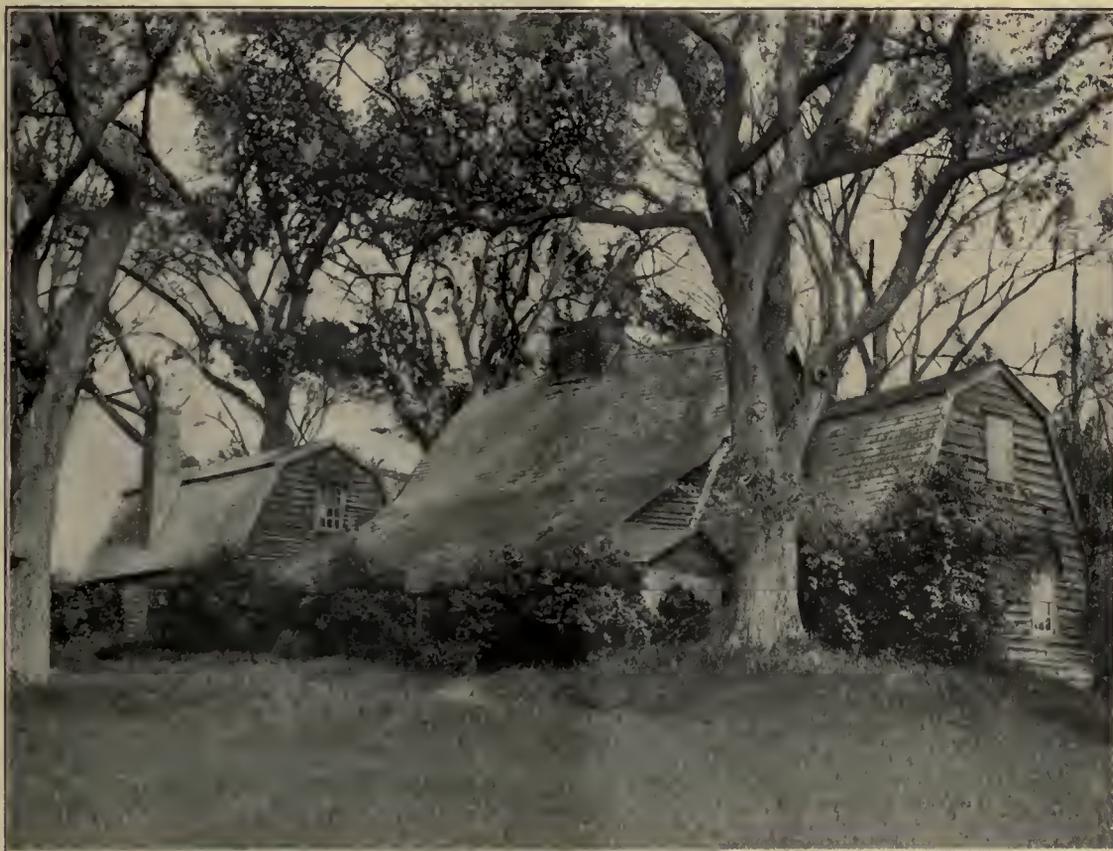
FORESTRY—THE RELATION OF WOOD TO THE DEVELOPMENT OF CIVILIZATION

BY WILLIAM CARSON

WE HEAR much and read much of the Coal Age, the Iron Age, the Age of Steel—and their influence on civilization. In our own time we have been impressed with the amazing changes brought about by iron and steel. We traverse continents on rails of steel; span broad rivers with bridges of iron and steel; ply the seven seas in ships of steel, and soar through the air in machines with steel frames. With steel tools and machines the luxuries of yesterday are brought in reach

tributed to all the ages. And though its functions have been in the quieter walks of life, less glorious and spectacular than iron and steel, its contribution to man in his struggle onward and upward has been no less bountiful.

Even before the dawn of history, man was dependent on it for his existence; and on every frontier down to our own day it has been one of man's chief reliances. It has been more than an influence; it has been essen-



Courtesy of The White Pine Bureau

THE "OLD FAIRBANKS HOUSE" AT DEDHAM, MASSACHUSETTS

The oldest house in America now standing in practically its original condition, again with the possible exception of the shell and adobe houses of Florida and California, is the "Old Fairbanks House," at Dedham, Massachusetts, the central section of which was built in 1636. The picturesqueness of this old, weather-beaten house, nestling beneath a wealth of overhanging elms and breathing the sweetness and charm of old New England, has an appeal unequalled by any other of the early Colonial houses. Although its unpainted white pine siding has stood exposed to the severe New England climate for almost three centuries, it is still almost perfectly preserved—a testimonial to the lasting qualities of wood.

of all, adding immensely to the comforts and enjoyment of life; and with other steel tools we fashion guns that hurl masses of steel twenty miles through the air and kill myriads of men. Truly the influence of iron and steel has been stupendous—stupendous beyond our conception.

Yet, though iron and steel are mere tyros as compared to wood, no period has been designated the Wood Age. No particular period could be. Wood has con-

tial—indispensable. Man first took refuge in the tree and with its branches built his fire to cook his simple meal. With his wooden club he went forth to provide food for himself and his family. He lightened his first journeys with a staff of wood, and as he became more venturesome floated down the water-courses on a log. When love of home conquered his roving disposition he scratched the ground with a stick and sowed his seeds, and in time made his first plow of wood. As the cen-

turies wore away and the great migrations came, wood was once more destined to play a leading role. On wooden wheels and in wooden boats man went forth to the ends of the earth—from Asia westward to Europe—and from Europe across the Atlantic to the New World.

As man pushed forward the frontier of civilization, commerce grew. We marvel at the millions of tons of freight transported annually on steel rails and steel ships; but centuries must pass before steel's tonnage can equal the traffic that has gone up and down the highways of the earth in wooden ships and on wooden wheels.

But wood has done more than provide man with his necessities and comforts. His earliest efforts in sculpture and carving were formed from wood. There stands today in the Gizeh Museum in Egypt a wooden statue, the oldest record of man's achievement in sculpture. If Moses saw it, he must have looked upon it in wonder, for it was 2000 years old before he was born. We think of wood as something perishable, as something that soon decays; yet here is a wooden statue, 6,000 years old—older than any stone or marble statue in existence. In passing it may not be amiss to remark that the oldest living things on earth are the giant Sequoia trees of California.

And in music—from the first hammerings on a wooden tom-tom to the symphony orchestra—wood instruments have thrilled man in all ages. No instrument of brass can produce the range and variety of tones or approach the human appeal of the wooden violin. The metal strings of the piano get their tone and quality from the white pine sounding-board.

Sometimes, too, I surmise that wood has been rather lavishly used in making the heads of some of our statesmen.

In this land of ours, wood—and especially white pine—has been a powerful influence in shaping her destiny. When the colonists came to New England and New York they found an abundance of white pine distributed over the country. The ease with which it could be worked made it readily accessible for sheltering the settlers and their stock. And later it gave expression to their culture and love for the beautiful in those stately houses and those dignified churches which still stand as sound as when they were built and give inspiration for so many of the beautiful architectural designs of today.

The history of the early Colonies repeated itself in the upbuilding of the great Middle West. The pioneers who came to the Mississippi Valley settled along the rivers and creeks where there was timber available or where it could be transported by water. The necessity for wood, with which to build their homes and barns, and for fuel, kept them from the more fertile prairies ready for the plow that lay back from the streams. As the settlers became more numerous the great white pine forests bordering the Great Lakes and the Mississippi, Chippewa and St. Croix Rivers were tapped, and they have ever since been serving the needs of the country. Fortunate indeed were the settlers to have such an abund-

ant supply of wood that was light, easily transported, easy to work, durable and good for practically all uses to which a soft wood can be put.

It is impossible to conceive the development of the Middle West without the white pine forests of Michigan, Wisconsin and Minnesota. Certain it is that the fertile plains of this great granary must have lain unproductive many years longer had not such an adaptable building material been so close at hand. And think what it means today that this vast region is producing food for us and for our Allies. The products from "the bread-basket of the world"—from the country of white pine houses and white pine granaries—may save civilization from the deadliest attack ever aimed at its progress.

And in this world crisis we of America and our Allies once more turned to wooden ships to save the day—to keep the supply of food unbroken for those who fought with us that democracy might rule the world and that all peoples might live together in peace and justice. Wood has been a powerful factor in the upbuilding of civilization—and we in our day have seen it one of the deciding factors in saving that which it has through the countless ages so laboriously helped to build.—(*White Pine Monograph.*)

USE OF CUT-OVER LANDS

A PRELIMINARY study of cut-over timberlands in the south, with a view to determining their best utilization, is being planned by Dr. H. C. Taylor, chief of the new Bureau of Farm Management of the Agricultural Department, and Dr. L. C. Gray, head of the new Division of Land Economics in that Bureau. Co-operation in this work is expected from State authorities, especially those connected with state agricultural colleges and experiment stations, and also from the various organizations interested in the development of the south.

The work this year will be limited by the appropriations made by Congress for the Bureau of Farm Management, which are not as large as requested by Secretary Houston.

In considering the problem of utilizing southern cut-over lands to the best advantage, it is planned to first mobilize data already in the possession of various branches of the government that bear upon the subject. If funds admit this will be followed up next year with a more extended investigation in a number of localities in the southern states. These investigations should include an intensive study of certain questions related to the colonization and development of cut-over lands and this should result in assembling a mass of detailed data that will be of great use in bringing about agricultural development in the southern states, particularly the coastal plain area extending from Virginia to Texas, in which is situated the bulk of the pine stump lands.

R. B. MILLER has been appointed State Forester of Illinois and assumed his new duties on July 1. The state forestry work is under the direction of the State Natural History Survey Division and is located at Urbana.

STATE NEWS

MINNESOTA

THE Minnesota Forest Service is just closing a deal with the Pine Tree Lumber Company for the purchase of approximately 6,000,000 feet of virgin pine timber within the boundary of Itasca State Park, the consideration, \$13.00 per thousand for white and Norway pine, \$9.00 for spruce and \$5.00 for jack pine; the land, about two thousand acres, together with the miscellaneous timber will constitute a gift to the State. It is valued at \$25,000 to \$30,000. One of the groves on this land, a magnificent stand of Norway and white pine, has been named the "Theodore Roosevelt Grove."

Itasca State Park and Forest was well provided for by the 1919 Legislature. As a result, the summer hotel property at Douglas Lodge has been greatly improved, a number of new buildings are being erected, including a large restaurant, to be known as the "Forest Inn." An electric light plant has been installed, thus reducing a considerable element of fire danger, fourteen sections of land on the west side of the forest will be bought, the necessary money being provided for the purpose. The State Forester has just arranged for the grazing of one bunch of sheep, twenty-two hundred head, along the west edge of Itasca Park and Forest. The Forester has contended for some time that the grazing of sheep in this kind of country, where there is so much grass, weeds and brush, would afford the best kind of fire protection. It is believed also that little, if any, harm would be done in the woods, since stock will not eat the little coniferous trees so long as there is an abundance of other forage. There was some question as to the advisability of permitting sheep grazing because of the possible effect on game range, but the location of the grazing area with respect to the feeding grounds of the deer safeguards this feature. Also, on account of the late entrance of the sheep, there will be no danger of their trampling the nests of ground-nesting birds. There is another feature worth watching in this connection. It has been difficult to obtain natural reproduction of pine in portions of Itasca Park owing to the dense growth of brush and small vegetation. There is a probability that sheep grazing will bring about more favorable conditions for pine reproduction through a partial removal of the brush and trampling of the soil to prepare it for the seed.

If this experiment works out satisfactorily, it will be the beginning of a great industry in that part of the State because there is range for several millions of sheep during the summer months. Sheep might

be brought from Montana and other Rocky Mountain States about the first of July, fattened on the abundant forage in the timber country of northern Minnesota and then sent to the stock yards of South St. Paul and Chicago. The Forester is convinced that the forest fire danger in Minnesota will be greatly reduced with the increase of stock grazing in the wooded districts. Fires in the woods do not run readily and are easily controlled wherever the grass, weeds and under brush has been even moderately eaten down by stock.

MARYLAND

WITH special war activities practically concluded, the Maryland State Board of Forestry has well under way numerous new projects of prime importance to forest owners and timber users of that State. The summer's field work has been arranged to develop various brand—new and useful activities, and to push to completion projects already undertaken.

An intensive study of willow culture, with new opportunities opened by the war, will shortly be finished and published. Volume tables have been or are being prepared for every commercial tree species in Maryland. Thousands of taper measurements of hardwood and softwood trees have been secured in sections of the State where these varieties reach commercial importance. Sets of curves are built on these at headquarters, and in the very near future Maryland will have its own volume tables to use and enjoy. These will be published, and made available to all requiring accurate, and localized, information in measuring, buying and selling forest products. They will not only include, as usual, lumber and cordwood, but will be made applicable also to all forest products for which each tree is fitted and used, in board feet or cubic contents. State co-operation is being extended forest owners in the practical improvement of their timbered holdings, foresters from the Board directing marking and estimating, and if necessary supervising cutting, on tracts from a few to several hundred acres in size. This work is well received, since it secures the owner reproduction of the best, removal of the poorest, and sale of material for what it is worth. In connection with and in extension of this, experiments in cheap and effective tree-killing are under way, methods employed, both old and new, being by mechanical and chemical means. Proper treatment of public trees is still assured through application of Maryland's Roadside Tree Law, and active supervision of all operations by the Board.

Profiteering landlords who charge too

much for summer cottages have been hit a body blow by free camp sites on Forest Reserves. The State's five Forest Reserves are open with few and easy restrictions to those feeling the summertime call of the wild. Camp sites have been selected, marked, and made ready by the State. Getting your "pick" is free of red tape; all the camper has to do is sign an application, send it in, and pitch his tent.

In co-operation with various private companies and progressive individuals, experiments in Loblolly pine reproduction on the Eastern Shore are being carried out. Information desired is on the best methods of securing N. S. R. in Loblolly. Sample plots are carefully laid out, and results will be watched until conclusive.

Ten years ago Maryland's wood-using industries were the subject of research and report. Recently, knowing these results to be old and the data no longer authentic, the Board took up a canvass of the subject. Much interest was manifested by the various industries approached, and practically 100 per cent co-operation gained in the preparation of a new and complete report, well illustrated, on "The Wood-Using Industries of Maryland." It is now in the hands of the printer, and will be issued shortly. Both study and subsequent report represent, exclusively, State work.

NEW JERSEY

FOR several years State Forester Alfred Gaskill has been urging owners of woodland to give their timber a little care and attention, in order that its value and productiveness might be increased. It has been the practice in this State and elsewhere to cut off the woods without care or thought of the future, and then allow Nature to do the best she can in replacing the abused timber growth. The following results of a "thinning" experiment in the so-called "scrub oaks" of Burlington County prove that such attention is profitable.

A portion of the Lebanon State Forest was selected for the demonstration. The tract consisted of a rather dense stand of young oaks from ten to twenty feet tall, growing on sandy soil of low fertility.

Two similar plots of approximately one acre each were laid out, and the trees on each counted and measured. Then plot No. 1 was "thinned" to relieve its overcrowded condition. Enough crowded, weakened and suppressed trees of the poorest species were removed to give the remaining trees the proper amount of light and growing space for their best develop-

125 MILLION FEET NATIONAL FOREST TIMBER FOR SALE

Location and Amount.—All the merchantable dead timber standing and down, and all the live timber marked or designated for cutting on an area of about 6,000 acres of Government land in T. 44 N., R. 4 E.; T. 44 N., R. 5 E., and T. 43 N., R. 5 E., within the watershed of Fishhook Creek, St. Joe National Forest, Idaho, estimated to be 33,000 M. B. M. green white pine; 9,000 M. B. M. dead white pine; 30,000 M. B. M. Engelmann spruce; 13,000 M. B. M. cedar; 12,000 M. B. M. white fir and hemlock; 10,000 M. B. M. larch and Douglas fir; 5,000 M. B. M. lodgepole pine, balsam fir and yellow pine saw timber, 60,000 cedar poles, more or less; and an unestimated amount of cedar posts, piling and shingle bolts. About 4,000 acres of privately owned timber in the same watershed is also available for purchase from the Northern Pacific Railway Company.

Stumpage Prices.—Lowest bid considered \$2.50 per M for green white pine; \$1.00 per M for spruce and yellow pine; 50 cents per M for all other species and dead white pine; and special rates for cedar products of various dimensions.

Prices will be readjusted at the end of the third, sixth, ninth and twelfth years.

Period for Removal.—A period of fifteen years will be allowed for the removal of the timber, with two additional years within which to construct initial improvements.

Deposit.—With bid, \$10,000.00 to apply on purchase price if bid is accepted, or refunded if rejected. Ten per cent may be retained as forfeit if the contract and bond are not executed within the required time.

Final Date for Bids.—Sealed bids will be received by the District Forester, Missoula, Montana, up to and including September 23, 1919. The right to reject any and all bids is reserved. Before bids are submitted, full information concerning the character of the timber, conditions of sale, deposits and the submission of bids should be obtained from the District Forester, Missoula, Montana, or the Forest Supervisor, St. Maries, Idaho.

ment. Plot No. 2 to serve as a check or control, was not thinned.

Seven years later, in June, 1919, neither tract having had any attention except protection from fire, the plots were again measured and the following results were noted: Plot No. 1 (thinned plot) had 380 living trees, the volume of which was 10.03 cords per acre, or an increase of 5.57 cords, not counting the one cord removed by thinning. Plot No. 2 contained 558 living trees, with a total volume of 8.63 cords, or an increase of less than a cord (.91 cords) for seven years' growth. In other words the thinned plot almost doubled its wood volume in seven years, while the adjoining unthinned plot in the same time increased less than nine per cent. Forestry pays! The State Forester is ready to help anyone interested in such a project.

KENTUCKY

J. E. BARTON, Commissioner of Geology and Forestry, announces at this time that the Kentenia-Catron Corporation will transfer to the State of Kentucky for use as a State Forest Reservation approximately 3,400 acres of land on Pine Mountain in Harlan County. The gift of this land to the State is in fee simple, subject only to existing contracts for the removal of certain timber on the area. The gift is made through Mr. Charles H. Davis, the President of the Company, and Mr. W. W. Duffield, Agent of the Company for Kentucky. The gift of this land to the State for purposes of a state forest is the biggest stimulus to the management of timber tracts under effective forestry principles that the movement in the State to this end has yet seen. The Kentenia-Catron Corporation has always had a keen interest in the forestry problems of the State and the concrete way which they have now taken to show this interest is worthy of their efforts heretofore in the same direction. The area has a mixed stand of hardwoods, common to the region, and includes some pines. The management of this tract on scientific forestry principles will serve as an excellent example of what can be accomplished under these conditions in the Southern Appalachian region. Active steps will be taken to put the area under effective administration at an early date. Immediate measures will be taken looking to the protection of the timber on the tract from fire and other destructive agencies.

ILLINOIS

THE Quincy, Illinois, High School has a forestry club, the purpose of which is to save the trees we have now and to plant others. A Science Club, of the same city, composed of twelve or fifteen enthusiastic nature students, has secured a small tract of land and is growing on it such forest trees as pecan, persimmon, walnut and chestnut, which are to be trans-

planted to suitable locations as the club members take their weekly hikes.

The University of Illinois has an experimental forest tree plantation begun in the spring of 1871 from which some interesting data should now be secured. An appropriation of \$1,000 was made in 1869 by the Legislature for trees and seeds. Thirteen acres were planted on prairie soil under the direction of Prof. T. J. Burrill, horticulturist and botanist, and G. W. McCluer, M. S., assistant horticulturist. It is located at the experimental farm, on Lincoln Avenue. Forest records were kept for 1871, 1872, 1876 and 1886 by Professor Burrill, in which are stated the amounts expended for plants, planting, cultivation, etc., and the receipts from thinnings. European larch, elms, spruce, white pine, soft maple, basswood, black walnut, Bur oak, red oak and hickory are the species which have done best. The forest is fenced and is used to some extent by the residents of Urbana as a park.

GEORGIA

EXTENSION Forester Zimm devoted the month of July to the Extension Schools, which are held in connection with the District Agricultural Schools. One phase of the work which Mr. Zimm is emphasizing is the preservative treatment of fence posts, shingles, and other farm timbers, and he has succeeded in establishing a small treating plant for demonstration purposes at each District School.

Vocational work in forestry and agriculture is receiving considerable attention at the Georgia State College of Agriculture. Approximately 150 rehabilitated soldiers have been sent to the College for special work and the Vocational Board states that preparation should be made to accommodate a total of between four and five hundred.

In connection with the program for Highway Construction and Improvement, to be conducted co-operatively by the State and the Federal Government, the Georgia State Highway Commission has recommended that the establishment of roadside trees be given consideration at the same time. The Georgia State Forest School, through the Extension Forester, has agreed to co-operate with the Highway Commission in this phase of road improvement.

A bill introduced in the Georgia General Assembly provides for the placing of all forestry matters in the hands of the Board of Trustees of the Georgia State College of Agriculture and empowering the Board to appoint a State Forester. The bill is the result of a conference of interested persons of the State and Mr. Peters, of the U. S. Forest Service. It is believed that the passage of this bill will enable the State to give proper attention to this most important of all natural resources—the forest. The bill has the enthusiastic support of the lumbermen of the State.

Creosoted Water Tanks— Home-Made—

The species and condition of wood specified for the creosoted water tank, shown below, permit employment of the Open Tank Process either at the shops of consumers or at the mills.

Loblolly pine is available at many isolated mills, which because of their location cannot economically supply lumber treated by pressure process. However, they could equip themselves to creosote by the Open Tank Process—*providing they will meet the necessary requirements of seasoning and framing.*

Lumber and timber, as specified, can be purchased from many sources by consumers, manufactured as required and creosoted by the Open Tank Process with Carbosota Creosote Oil, either at the *building site* or *shops*. The treating tanks, etc., required for creosoting can be made portable or stationary.

The Open Tank Process is *not* recommended as a substitute for the empty-cell pressure processes, where the latter is practical, but as a means of creosoting and



making this grade of lumber available for the purpose, under conditions where the empty-cell pressure process cannot be employed.

The Open Tank Process is efficient and comparatively economical, but requires a refined, coal-tar creosote oil. That means Carbosota Creosote Oil which conforms to U. S. Railroad Administration Specification R-828-A.

Carbosota is merely a trade-mark which guarantees an absolutely uniform, highly refined, pure, coal-tar creosote oil, physically fit for non-pressure treatments, and chemically of the highest preservative value.

(Green wood cannot be effectively creosoted by non-pressure processes. It should be air-dry. In regions of moist, warm climate, wood of some species may start to decay before it can be air-dried. Exception should be made in such cases, and treatment modified accordingly.)



Knowles Type Creosoted Water Tank erected at Mattoon, Ill., by the Illinois Central R.R. (Creosoted by Empty-Cell-Rueping Process 5 lbs. A.R.E.A. No. 1 Coal-Tar Creosote Oil per cubic foot.)

THE salient features of this type of tank, and the several factors that warrant recommending the Open Tank Process, are quoted from an address by C. R. Knowles, Supt. of Water Service, Illinois Central Railroad, published by the Southern Pine Association, in a pamphlet entitled "Southern Pine Tanks."

"The timber used in Loblolly Pine, coming under the general specifications for tank timber except that no restrictions are made as to heart or sap. The timber is air seasoned, and should be permitted to season for three months in favorable weather."

"A very important feature in the construction of these tanks is that all timber more than 1 inch in thickness is framed before treatment to secure the maximum life from the treated timber. The work of framing the tank before treatment, is given such careful attention that it is rarely necessary to bore a hole in the treated timber during the field erection of the tank."

"In water tanks, however, there is always an intermediate condition of moisture in which the wood is dry on the outside and wet on the inside, thus promoting rapid decay."

"It is difficult to point out any portion of the tank more susceptible to decay than another, although decay in the tops of the staves is more noticeable, and the timber probably decays more quickly here than in any other part of the tank."

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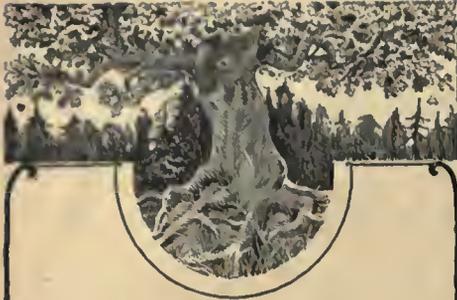
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PHILADELPHIA

SALE OF TIMBER, KLAMATH INDIAN RESERVATION.

CLIFF BOUNDARY UNIT.

SEALD BIDS, MARKED OUTSIDE "BID, Cliff Boundary Timber Unit" and addressed to the Superintendent of the Klamath Indian School, Klamath Agency, Oregon, will be received until 12 o'clock noon, Pacific time, Tuesday, September 23, 1919, for the purchase of timber upon about 10,000 acres within Townships 33 and 34 South, Ranges 7 and 8 East of the Willamette Meridian. The sale embraces approximately 100,000,000 feet of yellow pine and sugar pine. Each bid must state for each species the amount per 1,000 feet Scribner decimal C log scale that will be paid for all timber cut prior to April 1, 1924. Prices subsequent to that date are to be fixed by the Commissioner of Indian Affairs by three-year periods. No bid of less than three dollars and seventy-five cents (\$3.75) per 1,000 feet for yellow and sugar pine and one dollar (\$1.00) per 1,000 feet for other species of timber during the first period will be considered. Each bid must be submitted in duplicate and be accompanied by a certified check on a solvent national bank in favor of the Superintendent of the Klamath Indian School in the amount of \$10,000. The deposit will be returned if the bid is rejected but retained if the bid is accepted and the required contract and bond are not executed and presented for approval within sixty days from such acceptance. The right to reject any and all bids is reserved. For copies of the bid and contract forms and for other information application should be made to the Indian Superintendent, Klamath Agency, Oregon.

Washington, D. C., July 14, 1919. CATO SELLS, Commissioner of Indian Affairs.

PLANT MEMORIAL TREES FOR OUR HEROIC DEAD

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

AT the summer meeting of the Woodlands Section of the Canadian Pulp and Paper Association, mentioned in our last number, a discussion of vital importance to the forests took place. The work of fire prevention for the past seven years has shown conclusively that cut-over areas are the most liable to have fires started in them, and once started these fires are the most difficult to extinguish and do the greatest amount of damage. A few years ago when the areas cut over each year were comparatively small and often widely separated, a fire in a lumbered area only destroyed a small section, but now that the yearly cut has so increased, over two hundred per cent, and whole river valleys now are practically cut-over the situation is becoming very serious and some steps must be taken to dispose of the debris from logging. It is the general opinion of foresters and many lumbermen that the present method of cutting to a diameter limit is unwise, unscientific and wasteful. The coniferous trees, being shallow-rooted blow down, the remaining hardwoods soon form a dense cover and prevent the growth of the conifers and those trees which are left under the supposition that they will form a future crop, if they do not blow down, make practically no growth as they were, for the most part, suppressed. It has also been shown that where clean cutting of conifers and most of the hardwoods is practiced, a dense growth of spruce and balsam appears at once. The proper method to be adopted should be that of clean cutting of both conifers and hardwoods, brush burning and then management of the stand. By management is meant the proper thinning of the natural regeneration and the removal from time to time of the undesirable species. The time has certainly come when we should realize that to get the most out of the forest we must handle it according to the proper principals. Forest farming has its rules just as agriculture has and they must be followed and must be applied by men who know them and who have the necessary technical training. We can no longer continue to treat our forests as mines and use up our forest capital. Methods of cutting must be revised, slash must be disposed of and systems of management put into practice if we are to have forests in the future.

Clyde Leavitt, Forester to the Commission of Conservation and the Dominion Railway Board, was operated on in Ottawa,

June 25, and at last reports was doing very well.

Mr. F. W. Reed represented the U. S. Forest Service at the meeting of the Woodlands Section and took part in the discussion. Mr. Sterling, of James D. Lacey and Company, and Mr. R. S. Kellogg, of the News Print Service Bureau, were also present. Mr. Craig, of the Commission of Conservation; Mr. G. C. Piche, Chief Forester of Quebec; Mr. Prince, Chief Forester of New Brunswick; Mr. R. H. Campbell, Director of Dominion Forestry Branch; Mr. Avery, of the Spanish River Pulp and Paper Company; Messrs. Yberg and Jewett, of the Riordon Pulp and Paper Company; Mr. Galarneau and Mr. Nix, of the St. Maurice Paper Company; Mr. Cressman, of the Wayagamack Pulp and Paper Company; Mr. Sweezy, of the Royal Securities Company; Mr. Kiffer, of the Quebec Forest Service; Captain Tremblay, of the Donnacona Paper Company; Mr. Schanche, of the Abitibi Power and Pulp Company, and Messrs. Arnold Hannsen and R. W. Lyons, of the Laurentide Company, were among the Canadian foresters present.

The new classification of the Canadian Civil Service has just been published and the salaries for foresters are so low that no man who has taken four years at college and a technical two years' course thereafter can afford to work for the Dominion Government. Foresters have been rated lower than any other professional men. The result will be that the service will soon lose all its good men. Salaries in many cases are far below those that the present incumbents are receiving and in one case a position has been reclassified and will hereafter receive less than its present holder received on commencing nearly ten years ago. The schedule is as follows:

Some comparisons are of interest. The Dominion Entomologist is to receive \$3,900 to \$4,800; the Dominion Foresters, \$3,600 to \$4,500. A geologist is to receive \$3,300 and UP; a forester, \$1,680 to \$2,100. The Director of the Forest Products Laboratory is to receive only \$3,120 to \$3,600. In most cases Provincial Governments are paying better salaries, as do also private concerns. Practically the whole of technical staff of the Forest Products Laboratory has been engaged by private concerns. As inevitably the management of Government Forests must come into the hands of technical men, and as they constitute such a

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BY those who are competent to judge, it is asserted that the forests of France kept the Germans from Paris. How great a debt, then, does the world owe to them!

AMERICA can build no nobler memorial in Europe than by replacing the devastated forests of France, Great Britain, Belgium and Italy. ¶Answer this appeal at once by sending your check for whatever amount you can afford, to the American Forestry Association. It will help to purchase the seed needed to replant the forests of our Allies.

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Be as sparing and as judicious in pruning as possible, and do not raise the branches so high as to make the tree look like a telegraph pole.

Commence pruning the tree from the top and finish at the bottom.

Make every cut as close and parallel to the trunk as possible.

To make the cut perfectly smooth the saw must be well set and sharp.

Leave no stubs, dead and dying wood, or fungus-covered branches behind you.

Do not fail to cover every wound with coal tar, not allowing it needlessly to run down the trunk.

Do not remove several large branches on one tree at a time. They must be removed gradually, the work extending over several seasons.

large share of the natural wealth of the country the effect of putting such responsibilities on the shoulders of second-rate men will be disastrous.

The patrol flights of the seaplanes of the St. Maurice Forest Protective Association have commenced and are proving practical. It is easily possible to locate forest fires at forty to fifty miles and if they are not too far from a lake or a river the plane crew can descend and extinguish them. A forester who made a flight recently reports

that the various timber types can easily be distinguished and that photographs taken from the air will make most satisfactory maps.

Forest fires of large size are reported in the Cochrane and Cobalt districts and some cut pulpwood is reported destroyed.

The *Aftenposten*, a daily newspaper published in Christiania, Norway, has an article on Silviculture and Social Conditions in Canada, which refers to the work of the Laurentide Company and gives photographs of its nursery and reclamation work. It says that labor conditions in Canada are better than those in Norway and that Canada is getting ahead of Norway in forestry matters. The article was written by Mr. W. Rolsted, who is in charge of the Royal Forests.

The Province of New Brunswick has issued a circular letter appealing to school teachers and pupils to co-operate in preventing forest fires and to try and tell people how they can aid this great work. It explains how to build and extinguish a camp fire, how to notify a fire ranger in case a fire is discovered, and describes the uses and necessity for keeping our forests.

In forestry, as in every other movement for better conditions education is the most important thing. Legislation, especially if repressive, arouses antagonism, and often defeats its aim. Education of all, from the child to the adult, brings the best and quickest results. The writer is reminded in this connection of an incident which he witnessed while living in Switzerland. A bill was brought before the legislature for compulsory old age insurance. A few months before the bill was to be voted on the government sent around to every city, village and hamlet, lecturers who discussed both sides of the question impartially, giving figures of the cost of such a scheme, the results attained in other countries and all possible information. When the time came for the vote, the people knew just what they were doing and had thoroughly discussed the thing among themselves. It has been said that for twenty years forestry propaganda has been carried on in the United States and is still without appreciable result. The trouble has been that the propaganda has not reached the people and has not been sufficiently intensive. It has been too technical and has not aimed at one reform at a time. It has tried to cover the whole field. People who have always been interested in the forest are reached but the great mass of the people see the question still as one of more or less academic interest only. It must be brought home to them more directly.

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FOREST DESTRUCTION PREVENTED BY CONTROL OF SURFACE FIRES

(Continued from Page 1264)

from five to fifty years, the periodical rotation depending upon the local rate of litter accumulation. The litter is then too wet to cause crown or ground fires.

2. Do not light fires in the forest litter after the humus becomes dry. A wet humus serves as an index to the safe firing season and prevents ground fires.

3. Do not light fires while a high wind is prevailing.

4. Burn the snags in mid-winter when the conditions are unfavorable for fires.

5. Fire the lodgments of litter while conditions are still unfavorable for surface fires.

6. Light the first fires over the areas of least litter and least density of stand.

7. Backfire from the barriers. These barriers may be roads, trails, canals, barren and cultivated areas, recently burned-over areas, bodies of water, ice and snow, and barriers scraped for the purpose.

8. Burn over the southerly slopes while the snow is on the north slopes.

9. Burn downward from the tops of the slopes.

10. Fire the ridges before the slopes and the slopes before the ravines.

11. In initiating fire control, the order of burning should be as follows for a five year rotation:

1st year—Standing dead trees.

2nd year—Ridges.

3rd year—South slopes.

4th year—North slopes.

5th year—Ravines.

These rules will often conflict and require a logical interpretation to fit the local conditions. No firing should be done without a thorough investigation of the litter conditions, topography, barriers, species and ages of trees and a study of the fire resistance of various species of trees. Standing dead snags, fallen trees, underbrush, limbs, cones, leaves, needles, weeds and any dead and inflammable material should be included as litter.

The importance of fire as a silvicultural agent in the coniferous forests has been recognized in that it has become the general practice to burn over cuttings to insure reproduction. The fires must be confined, of course, to moderate surface fires as would be possible if the foregoing rules are used. Fire is an aid to reproduction as it creates favorable conditions for the germination of the seeds, by removing competition, preparing the seed bed, opening the closed cones and releasing the seeds, temporarily driving away seed eating rodents, and removing insects and fungus. Fire serves to keep a forest clean and healthy by removing the insects and fungus diseases which have their origin in the rotting litter on the forest floor. The use of fire is a silvicultural method particularly adaptable to the coniferous forests because

of their great fire resistance and the fire favors the more valuable species and the high-limbing sports. A young conifer tree will withstand the intense heat which kills all but the topmost branches and the effect is similar to that in the pruning of a fruit tree—more vigor is put into the trunk and the new growth.

Our attempt to maintain the non-fire policy has shown that forest fires are inevitable where the forests contain a large proportion of inflammable litter. The destruction by fire increases as the litter increases. "Fire prevention," so called, simply delays the burning up of the last conifer tree where it stands.

The use and control of the surface fire is the solution of the fire problem in the coniferous forests.

PIGEONS WILL PROTECT FORESTS.

THE War, Navy and Interior Departments, according to information just received by the Manufacturers Aircraft Association, New York, are co-operating in the forest patrol. The idea of such a guard against timber fires occurred simultaneously to the Forest Service and to the air service of the Army. Now comes the Navy Department with the offer to establish pigeon lofts in the forest reserves and to provide the forest airplane patrol with carrier pigeons whose duty it would be to carry messages direct to home relief stations whenever a fire is discovered.

The pigeon branch of the Navy is expanding under the direction of Lieutenant McAtee, and recruits are now sought for this service, which is so closely akin to aviation that it is under the same general administration.

During the war there was no opportunity to train men for this important duty, but now a special school has been opened at Anacostia and twenty enlisted men are receiving daily instruction in the training and keeping of carrier pigeons. At the same time these men have opportunity to put their learning to practical uses.

The pigeon branch of the Navy has 2,500 birds. Plenty are available for the forest patrol. Experiments are going on constantly in the effort to increase the efficiency of the birds. Pigeons took an important part in naval warfare overseas. It has been proved that pigeons can fly at a speed at least equal to that of a sea plane or flying boat.

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BOOK REVIEWS

"The Book of the National Parks," by Robert Sterling Yard. Charles Scribner's Sons, New York. Price, \$3.00. The author of this book possesses all the attributes necessary to contribute to the success of such a work, being an official in the Department of the Interior and so thoroughly informed on his subject, as well as a writer of note and an enthusiastic lover of the out of doors. His book is a valuable contribution to the slowly growing literature on our national park system. It will fill a long-felt want, carrying, as it does, in interesting fashion, an account of the historical, scenic, geologic and recreational features of the parks; and treating in a popular way the geologic and other scientific features. It is well illustrated and has 15 maps and diagrams.

"Timber: Its Strength, Seasoning and Grading," by Harold S. Betts. McGraw-Hill Book Company, New York. Price, \$3.00. The preface states that this book is intended primarily for engineers, manufacturers and users of lumber and of various special classes of wood material, and students of engineering and forestry. Much technical information in readily accessible form is available regarding almost every class of structural material with the exception of wood, and this book will in large measure supply this deficiency.



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POSITION wanted by technically trained Forester; college graduate, 37 years of age and married. Have had seven years' experience in the National Forests of Oregon, California, Washington and Alaska. Also some European training. At present employed on timber surveys as chief of party in the Forest Service. Desire to make a change and will be glad to consider position as Forester on private estate, or as city Forester. Will also consider position as Asst. Superintendent of State Park and Game Preserve in addition to that of Forester. Can furnish the best of references. Address Box 820, care American Forestry Magazine, Washington, D. C.

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POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, Care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, Care American Forestry Magazine, Washington, D. C. (1-3)

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TABLE OF NATIVE MAINE WOODS

NINETEEN different kinds of native Maine woods are used to make a handsome and unique table for the Directors' and General Conference Room in the offices of the Eastern Forest Products Association at Bangor. The table is eight feet long and three feet wide with five legs. The top is made of six boards six inches wide, of the following woods; white ash, birdseye rock maple, black cherry, curly yellow birch, beech and quartered white oak.

The legs are of elm, hickory, chestnut, butternut and mahoganyed yellow birch. The ledge boards are of sycamore, white birch, brown ash and cherry birch. Under the margin of the top is a plate to give a thick top effect which is made of white pine, hemlock, white cedar and red spruce. With the exception of the mahoganyed leg, each piece is in natural finish and the effect is beautiful.

The table was the idea of H. G. Wood, Executive Secretary of the Association, and was made by Morse & Company, at Bangor, a member of the Association. The boards of birdseye maple and curly birch are exceptionally choice and are said by many to be the handsomest they have ever seen.

PLANT MEMORIAL TREES

FALL IS THE TIME TO PLANT NARCISSUS AND TULIP BULBS

TULIP bulbs should be planted in October, preferably about the middle of the month, and narcissus bulbs may be planted up to the middle of October, but preferably about the first of the month, according to specialists of the United States Department of Agriculture.

The bulbs should be planted in loose, rich soil, devoid of rank, or unrotted, or poorly incorporated manures. It should be dug to a depth of from 12 to 15 inches. The tulip bulbs should be set 5 inches apart and 4 inches deep and the narcissus bulbs about 10 inches apart and 5 inches deep.

If they are to be grown in pots or window boxes, light rich soil should be used. Place 1 to 2 inches of cinders or broken pots in the bottom of the pots or boxes to insure good drainage. After planting, place the pots or boxes out of doors and cover them with about 4 inches of ashes or sand; or they may be placed in a dark cool room or cellar for a few weeks, until the bulbs have formed a quantity of roots. They may then be brought into the light and heat for flowering. Keep the soil well moistened from time of planting, but avoid overmoistening, for if kept too wet the bulbs will decay.

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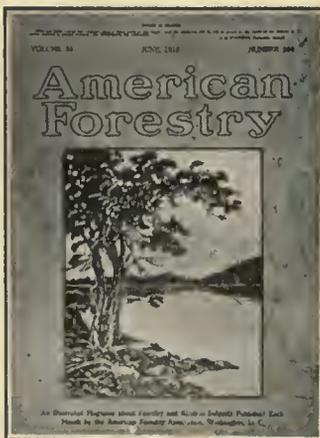
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SEPTEMBER 1919 VOL. 25

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THE PINES

(An old legend)

BY LEW. R. SARETT

When the rolling waters covered the earth,
The mountains learned to love the waters.
When the whispering ocean rolled away,
The hills grew lonely for its music.
They prayed to the Spirit to send the sea back
To sing again to the mountains.
Then the Father planted the murmuring pines
At the foot of the hills, in the quiet valleys,
To sing of the sea in the winds of twilight;
To ripple and sigh in the breezes of evening.

AMERICAN FORESTRY

VOL. XXV

SEPTEMBER, 1919

NO. 309

FOREST LOSSES ON THE ITALIAN FRONT

BY NELSON COURTLANDT BROWN

U. S. TRADE COMMISSIONER

(Photographs by Courtesy of the Italian General Headquarters)

UNTIL October, 1917, the fighting along the Italian front had been restricted almost exclusively to the mountainous regions. The line, until that date, stretched from the mountains of the Carso region and the upper valley of the Isonzo along the Carnic and Julian Alps to Switzerland. The high divide along the crest of these mountains constitutes the natural boundary between Italy and Austria, and the small region about Trieste and the upper valley of the Trentino constitutes the "Italia Irredenta" for which Italy has largely been in the struggle. Before the unfortunate retreat from Caporetto the Italian front was longer than the entire Western front in France and Belgium, a fact which is generally not appreciated in this country. The total length formerly was about five hundred miles. For the year preceding the signing of the armistice, the length of the Italian front was about two hundred and twenty miles. Fighting in this rugged and precipitous Alpine country

was naturally carried on under the most extreme physical hardships. Correspondents who have been on all of the fronts have informed me that the tremendous physical difficulties encountered on the Italian front have far exceeded those of any of the other fronts and one can easily understand this when seeing how the men live and fight and bring up their supplies under those most unusual conditions. The first impression one has is that it is difficult enough to merely exist in that precipitous Alpine region without attempting to maintain a fighting front and to bring up heavy guns and enormous quantities of supplies which fighting in that country involves.



Photograph by courtesy of the Italian General Headquarters

YOUNG AND SCATTERED FOREST GROWTH IMMEDIATELY BACK OF THE LINES ON THE HIGH ASIAGO PLATEAU—PURPOSELY LEFT TO PROTECT MEN AND SUPPLIES GOING TO AND FROM THE FRONT LINE TRENCHES. IT WAS PRACTICALLY WINTER THROUGHOUT THE YEAR ON THE HIGH ITALIAN ALPINE FRONT WHERE A CONSIDERABLE PART OF THE LINES WERE FROM 6000 TO OVER 9000 FEET IN ELEVATION.

For the last year of the war the Italian front ran partially across the flat Venetian plain, the Piave River forming the boundary from the Adriatic Sea to Valdoppiana, where it crossed the Piave River and rose sharply from the flat plain to the higher altitudes of the Alps. There is a most abrupt change from steep mountain topography to the flat plains,



Photograph by courtesy of the Italian General Headquarters

ITALIAN INFANTRY AWAITING THE ORDER TO ADVANCE TO THE COUNTER ATTACK ALONG THE RAILWAY NEAR NERVESA ON THE MORNING OF JUNE 24, 1918. JUST AFTER THE AUSTRIANS HAD CROSSED THE PIAVE RIVER IN THEIR ATTEMPT TO REACH VENICE, PADUA AND MILAN. SOME OF THE BITTEREST FIGHTING OF THE WAR TOOK PLACE HERE AND AFTER TWO WEEKS OF CONSTANT STRUGGLE THE ENEMY WAS FINALLY HURLED BACK ACROSS THE RIVER WITH AN ESTIMATED LOSS OF 250,000 MEN DURING THE LOWEST EBB IN THE MORALE OF THE ALLIES. THE ITALIANS MADE A GREAT STAND AND FINALLY WON ONE OF THE GREATEST VICTORIES OF THE WAR.

somewhat similar to the sharp rise of our own Rocky Mountains from the flat Colorado prairie. The line crosses Monte Grappa, Monte Rossa, dips down across the Val Brenta, crosses the high Asiago Plateau, dips once more in the double valley on each side of Monte Cimone and across Lake Garda, then rises across the highest parts of the Alps, including the Posilipo and the Posubio, to the Swiss border.

Through the kindness of the Italian war officials and the General Staff it was my privilege to investigate the conditions along practically the whole Italian front, including both the lines along the flat Piave River plain and the higher mountain country as well. Captain Scaravaglio, of General Headquarters, proved to be not only a courteous and gracious host but a most intelligent and well-informed officer on the conditions at the front. He had summered and tramped over a good section of this mountainous country. He said the whole mountain front had never been a heavily forested section. The upper slopes contained scattered stands of silver fir and Norway spruce, while the lower slopes, particularly in the gulches and ravines, contained open stands of chestnut and oak. There was a good deal of young growth and middle-aged timber, and sporadic attempts had been made at reforestation on the more favorable locations. In some of the upper valleys, particularly on the Asiago Plateau, there were good stands of silver fir and Norway spruce, running from eight to twenty thousand board feet per acre or more.

As a result of continual fighting and heavy artillery bombardment, the whole mountain front has been practically cleared of all evidences of timber growth, in many cases the upper soil being so dotted with shell holes that

not a living plant is in evidence. Stumps of trees here and there give evidence of former stands of timber and shattered and broken trunks stand out like skeletons against the sky, the only remains of former timber growth.

The whole mountain section immediately appeals to one as being the most urgent subject for reforestation and it will require considerable effort and much money to bring back this beautiful mountain region to even the sparsely forested condition which it presented prior to the war.

Along the Piave River front, the country on both sides is one of the most fertile agricultural regions of the world, as the crop statistics substantiate, so that generally speaking, there has been little forest destruction. While on the battlefield of Monttello a few days after the Austrians had been repulsed with

great losses from their advance beginning June 15 across the Piave, an excellent opportunity was given to study the effects of shell and gun fire in an old chestnut grove back of the little village of Nervesa which had been used



Photograph by courtesy of the Italian General Headquarters

A COLUMN OF AUSTRIAN PRISONERS, GUARDED BY ITALIAN SOLDIERS, PASSING THROUGH ONE OF THE PICTURESQUE OLD WALLED TOWNS BACK OF THE PIAVE FRONT EN ROUTE TO CENTRAL ITALY FOR VARIOUS KINDS OF EMPLOYMENT. THE ITALIAN GUARDS MAY BE DISTINGUISHED BY THEIR STEEL HELMETS.

as the point of crossing on pontoon bridges by the Austrians. The trees had been torn to pieces as if a combined hurricane and electrical storm which had hit every tree, had recently destroyed the whole section. When a shell hits a tree the contact fuse causes an explosion and the shattering of the trunk or limb in both directions so that a severe splintering effect is the result. On Monte Grappa, which is the keynote of the whole mountain front, acre after acre has been literally "chewed up" by successive bombardments until the whole surface was a mass of shell holes. Near Monte Cimone not only the picturesque little Alpine villages but nearly every living thing in the form of a tree of any size has been destroyed as well. West of Lake Garda, the front was commonly above timber line at elevations of from 6,000 to 9,000 feet above sea level. Little damage to forest growth consequently is evident in those sectors.

Reforestation strikes the imagination at once as being the only salvation for this situation. The land is too rough and rugged to be suitable for agriculture and much of it is so rocky and precipitous that it is not even suitable for development into a grazing proposition. Before the war many parts of Italy were in sericous need of reforestation but now that the war is over Italy should devote a large share of her efforts along the lines of reforestation in the devastated forest regions overlooking the fertile valley of the Veneto.

Undoubtedly the happiest and most contented in all Italy during the war were the Austrian prisoners. Asked if they wished to go back to their native land, the invariable answer was that even if they had an oppor-



THE FRONT LINE OF TRENCH ON MONFENERA, AN OUTLYING RANGE FROM MONTE GRAPPA, THE KEYNOTE OF THE ITALIAN MOUNTAIN FRONT. THIS HILL WAS FORMERLY FAIRLY WELL FORESTED. SCANT REMAINS OF TREES ARE SEEN IN THE RIGHT BACKGROUND. IN THE DISTANCE IS THE PIAVE RIVER, FLOWING ACROSS THE FLAT VENETIAN PLAIN. ON THE RIGHT OF THE RIVER IS THE MONTELLO, WHERE THE AUSTRIANS BEGAN THEIR BIG OFFENSIVE OF JUNE 15, 1918.

tunity to get back, either by stealing away or by exchange of prisoners through Switzerland, they would only be ill-fed, harshly treated, and forced to fight at the front once more. This prospect held out no attraction to these prisoners at all. Especially was this so in the case of the Hungarians, the Czechs, the Slovaks and the Slovenes.

It had always been a matter of interest what a country like Italy actually did with several hundred thousand of these prisoners, that is, whether they were kept in barbed wire stockades or employed on some useful and productive work. They are actually found doing almost everything in the way of physical labor throughout Italy. One finds them chiefly on railroad work, on construction of bridges, homes for refugees, clearing land, farm work, and all sorts of forestry work, and saw mill and woods work.

They are always used in small squads of from twenty-five to fifty or sixty and one is surprised at the comparatively small num-



Photograph by courtesy of the Italian General Headquarters

A MACHINE GUN LOCATION ALONG THE FRONT LINES BORDERING THE PIAVE RIVER. THIS IS A COMMON FORM OF PROTECTION FROM MACHINE GUN FIRE AS WELL AS ARTILLERY AND ENEMY AIRPLANES.



AN ATTACK OF THE ITALIAN INFANTRY ACROSS NO MAN'S LAND ON A HIGH PLATEAU. THE BARBED WIRE ENTANGLEMENTS HAVE BEEN BROKEN OR LOWERED BY THE ARTILLERY FIRE, PERMITTING THE TROOPS TO PASS THROUGH. THE FORMER VEGETATION HAS BEEN ENTIRELY SWEEPED AWAY BY GUN AND SHELL FIRE OR CUT OFF AND UTILIZED FOR FUELWOOD, SHELTER, TRENCH TIMBERS AND OTHER PURPOSES, BY THE TROOPS.

ber of armed guards that go with them. It was quite a customary sight to see only one armed Italian soldier guarding a bunch of prisoners. Asked about the danger of escape, almost always the invariable answer was that the men were so happy and contented that there was no danger whatever of their attempting to get away. Their only fear was a possible exchange of prisoners, in which case, there was anything but a pleasant prospect in store for them. The casual traveler in Italy was struck at once with the serious need of reforestation that is apparent almost everywhere. The ever-present rugged mountain topography in the Swiss and Savoy Alps of the north, the Apennines running almost the entire length of the peninsula, the Calabrian range in the south, and the mountains of Sicily present many glaring needs of reforestation. Added to this situation, the Italian forestry officials have been forced to cut many of their splendid forests to meet the great war emergency. Austrian prisoners have, in many cases, been used to reforest these cut-over areas. Many of them have already had experience in reforestation activities in Austria and so are proficient in the work. The Italian forestry officials have adopted an excellent plan, that of replanting immediately all areas cut over, and every effort is made to bring back the denuded areas to a well-timbered state once more. Many experiments have been made in reforestation at the Royal Experiment

Station at Vallambrosa, where there are seven nurseries, totaling about eighteen acres, and which have a capacity of about one million plants a year. As a result of these experiments, they have found that *Abies Pectinata* (Silver Fir) will produce the best results. For the past three years, before the war ended, Austrian prisoners had been preparing the seed beds at some of the State forestry stations in the Apennines, as well as doing the actual work of transplanting and field planting. In the seasons of the year when there is no planting or nursery weeding, or other work associated with reforestation to be done, the men are

employed about saw mills and in woods work, cutting down the mature timber, and on the work of transporting the logs to the mill, and in road and construction work associated with the general improvement of the forests.

Aside from silver fir, in some locations Norway spruce and Scotch pine are used for reforestation and to a limited extent some chestnut is planted. There is considerable beech on the higher mountains of Central Italy



Photograph by courtesy of the Italian General Headquarters

ITALIAN INFANTRY IN ACTION ALONG THE PIAVE RIVER FRONT BELOW NERVESA WHERE THE AUSTRIANS MADE ONE OF THEIR THREE CROSSINGS IN THE BIG OFFENSIVE OF JUNE 15, 1918. NOTE THE CROOKED CHARACTER OF THE TRENCHES IN ORDER TO RENDER AS INEFFECTIVE AS POSSIBLE ARTILLERY FIRE DIRECTED AGAINST THEM. THE BRUSH IS ALSO PILED TO DISGUISE THE EXACT LOCATION OF THE TRENCHES. THE RIVER VARIES FROM ONE QUARTER TO OVER A MILE IN WIDTH BELOW THIS POINT.

but this is always left to reforest itself naturally. For reforestation work, silver fir, spruce and pine seedlings are kept in the seed bed for two years and for three years in the transplant beds. Before the war it cost about six lire, or about \$1.20 per 1,000 to produce these five-year-old plants. At that time, labor cost from 75 cents to \$1.25 per man per day. The planting alone, before the war, cost about 20 to 24 lire per 1,000 plants, or from \$4.00 to \$4.80. The total cost, therefore, of the plants placed in the ground would be from \$5.20 to \$6.00 per 1,000 plants. For the past three years this



Photograph by courtesy of the Italian General Headquarters

AN INTERESTING PHOTOGRAPH SHOWING THE METHOD EMPLOYED IN CAMOUFLAGING A HIGHWAY ALONG THE ITALIAN FRONT WITH BRUSH AND BRANCHES. PLAITED STRAW, WICKER WORK, MATTINGS, AND CLOTH WERE ALSO COMMONLY USED. GREAT QUANTITIES OF LUMBER, POLES AND TIMBERS WERE USED IN THE WORK OF CAMOUFLAGING THE HIGHWAYS, MUNITION DUMPS, ARTILLERY LOCATIONS, ETC.

cost has been materially lowered where Austrian prisoners were used, because the wages paid were comparatively lower and the cost of feeding the men was only about 20 cents to 35 cents a day per person. In setting the plants out in the field on areas recently clear-cut of mature timber, the silver fir plants are placed one and one-half meters

apart in every direction, that is, the spacing is not prepared in rectangular shape as is customary in this country. The pine and chestnut transplants are placed only two meters apart. It has been found that planting can be successful in both



Underwood and Underwood

TRULY A "NO MAN'S" LAND.

THIS IS THE SHELL-TORN FOREST ON THE PEAK OF MONTE GRAPPA OVER WHICH THE ITALIANS DID THEIR FIGHTING TO STOP THE AUSTRIAN OFFENSIVE OF JUNE 17, 1918. STUMPS OF TREES AND SHATTERED AND BROKEN TRUNKS STAND OUT LIKE SKELETONS AGAINST THE SKY, THE ONLY REMAINS OF FORMER TIMBER GROWTH.



Italian Official Photograph

A HEAVILY SHELLED PORTION OF THE AUSTRIAN TRENCHES AFTER THEIR CAPTURE BY THE ITALIANS. NOTE THE "CHURNED" APPEARANCE OF THE GROUND AND EFFECT ON THE TREE GROWTH OF THE VICINITY.

the spring and fall, but particularly in the Apennine Mountains of Central Italy centering about Tuscany. Planting usually begins in March on the lower slopes, while at the higher elevations, running up to three and four thousand feet, planting is done as late as the middle of April and even as late as early in May. The plan of reforestation calls for improvement cuttings every ten years and at maturity the whole areas are clear-cut and replanted at once.

Silver fir is usually cut when mature at ninety years of age. Beech is cut at from ninety to one hundred and twenty, unless desired at an earlier age for charcoal purposes, and the Scotch pine and spruce are cut at from one hundred to one hundred and twenty years. The officials have decided to plant pure forests, that is, an area is planted with pure fir or pure pine, as it has been determined that the quality is inferior when these trees are grown in mixed forests in that region.

While at Boscolunga, one of the most important State forests along the crest of the Apennine Range between Florence and Bologna, there was an opportunity afforded to see just how the Austrian prisoners worked and lived and felt about their life as captive prisoners in a foreign land. In talking with

them they all seemed satisfied with what they were doing, all certainly looked well-fed, and none of them expressed a desire to get back before the war was over. One bright and husky young Hungarian had had two fingers cut off in an accident in the saw mill, but in reply to a question about whether or not he wished to return, he said that he wanted to remain there after the war and get employment in the saw mill if they would take him. The manager said he was one of the best workers about the place and he hoped that he would remain after the war, as he found him one of the most faithful and efficient among those in his employ. The men slept in clean and commodious bunk-houses which reminded one so much of some of those attached to the Ranger stations in our

national forests in the west. Each man had a clean, separate bed and the food was the same as that given to the Italian soldiers. A typical daily menu would be about as follows: For breakfast, war bread and coffee (practically the same as is served in all the hotels, that is, without butter, sugar, marmalade or preserves, etc.). For dinner at noon they received a thick vegetable soup or stew, and macaroni, with bread and a little wine. For supper, they received usually "Risotto" or rice, served up in one of the many styles for which the Italian chefs



AN OBSERVER'S LOOK-OUT CAMP IN THE HIGH MOUNTAINS OF THE ALPINE FRONT, PROTECTED FROM DETECTION BY THE ENEMY BY THE SURROUNDING FORESTS. THIS WAS TAKEN IN THE HIGH MOUNTAIN FRONT BETWEEN THE BRENTA AND PIAVE RIVER VALLEYS. IN THE DISTANCE IS SHOWN ONE OF THE DEEP INTERIOR VALLEYS OF THE MOUNTAIN FRONT.



Photograph by courtesy of the Italian General Headquarters

A COMMUNICATION TRENCH IN A HEAVILY SHELLED PORTION OF THE ITALIAN FRONT. THERE WAS FORMERLY A GOOD FOREST GROWTH IN THIS SECTION BEFORE THE WAR. ALL TREE GROWTH NOT DESTROYED BY THE TERRIFIC SHELL FIRE WAS USED BY THE SOLDIERS FOR FUEL PURPOSES, FOR TRENCH FACING, DUG-OUTS, DUCK-BOARDS, ETC.

are famous, bread, coffee and tea, and a dish of vegetables, such as beans, potatoes, or meat hash. One might ordinarily ask if there were no desserts served. However, no sweets, such as cake, pudding, pie, etc., were served anywhere in Italy during the war. The only dessert offered at the hotels was fruit and occasionally some cheese.

By way of contrast with these well-fed, happy and contented prisoners, an opportunity was afforded at Genoa to see how some of the repatriated Italian prisoners returning from Austria appeared. We helped to feed a whole trainload as they came from Switzerland, and the poor soldiers were the most emaciated men that can possibly be imagined. They fairly fought for the food which was rushed to them at the car windows. Another trainload of returned prisoners from Austria stopped a short while later and the food could not be served because the men were in such serious condition that they could not be fed the coffee, chocolate, eggs, sweet chocolate, fruit, etc., which the Red Cross organizations had prepared for them. The men

were too weak to rise from their bunks on the train, and the glaring eyes, sunken cheeks, and pallid complexions bore silent witness of their terrible treatment in Austria. We were informed that many of the poor boys died before they reached their destination at the hospitals along the Italian Riviera.

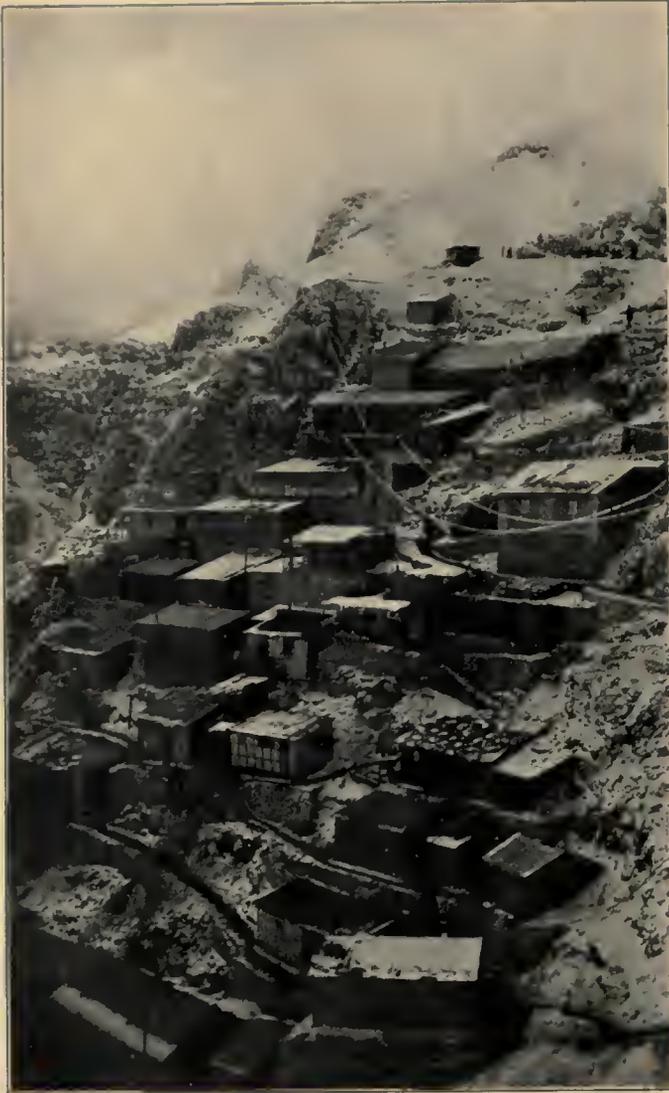
Many acres of land have been reforested in Italy during the war, not only by Austrian prisoners but by women, men past the military age, and by young boys and girls, but after the war throughout Italy there will be a great need for reforestation of these devastated acres and the denuded and bare mountain slopes. No one appreciates these needs better than do the Italian forestry officials themselves and there are plans already under way to provide funds whereby most rapid progress can be made.

By way of comparison with forestry in this country, the situation in Italy is most interesting. The first impression in visiting Italy is the vast resources in timber growth in this country, the great variety and individual size of the tree species, a well defined and supported national forest policy and the



Italian Official Photograph

IN ONE OF THE BEST SPRUCE FORESTS NEAR THE LINES ON THE ASIAGO PLATEAU NEAR THE VAL BRENTA SO OFTEN MENTIONED IN THE COMMUNIQUEES FROM THE ITALIAN GENERAL HEADQUARTERS. VERY LITTLE OF THE FOREST ON THE HIGH ALPINE FRONT WAS AS FORTUNATE AS THIS IN ESCAPING THE ARTILLERY FIRE OF THE ENEMY. EVEN THIS FOREST HAD BEEN HEAVILY CUT OVER TO PROVIDE MUCH NEEDED TRENCH TIMBERS, CAMOUFLAGE POLES AND FUELWOOD FOR THE TROOPS.



BARRACKS OF THE ITALIAN TROOPS ON A PROTECTED SLOPE IMMEDIATELY BACK OF THE FRONT "SOMEWHERE" IN THE ITALIAN ALPS. NOTE THE TELIFERRICO USED TO BRING UP SUPPLIES AND TAKE DOWN THE WOUNDED.

most highly developed lumber manufacturing industry, as compared with similar features in Italy.

Forestry in Italy may be described as a direct reflection of her political and economic history. It must be remembered that Italy, although old historically, is young politically, and that until comparatively recent times, she has passed through a rapid succession of political changes which have wrought great havoc not only with her forests, but her industrial and economic development as well. Italy is often regarded in this country as a land of old historical associations, of interesting old Roman ruins, the land of poetry, painting and the opera—a sort of "dream land" which annually attracts its large quota of tourist travel. This impression is quite a natural one, but Italy is much more than is most often associated with it. The war has greatly unified and strengthened the nation, and with the development of her important water power properties and the conversion of her great munition plants to peace-time activities, her industrial future is well assured in spite of the lack of such import-

ant fundamentals for development as coal and iron resources.

For many centuries and until the year 1870, Italy was under Austrian and Spanish rule or was largely made of small individual kingdoms, principalities and papal states, which were highly jealous of each other. As a result of these long continued and seriously disturbed conditions, forestry has suffered severely. Early Roman records show that the practice of forestry was considered, and even adopted in some of its primitive forms, in the days of the old Roman Republic as written records of Pliny and Horace give evidence to posterity. Although one is impressed with the small size of trees, and the unsatisfactory condition of a large portion of the Italian forests, there are many evidences still extant which bear witness to the fact that the country was, at one time, well forested. The Italian peninsula is essentially a mountainous section, and the greater part of the entire Apennine Range was once well covered with beautiful forests. For example, in such splendid old structures as the Palazzo Vecchia in Florence, there are many large beams up to 16 x 16 inches in cross-section, and some even as large as 20 x 24 inches, and from 50 to 70 feet in length, which have been in constant service for practically a thousand years.

With the establishment of the present unified Italian Kingdom in 1870, forestry in Italy received considerable attention from the government authorities, but there were many difficulties and drawbacks in the way of governmental control, and the better handling of the forest resources. In the first place, the government was embarrassed with the lack of sufficient available funds, and most of the forests had been so heavily cut over and burned that there was a scant remnant of the original forest cover. Then too, the old practice of cutting the young and growing forests for charcoal had a most



Photograph by Nelson C. Brown

THE HEADQUARTERS OF THE ITALIAN GOVERNMENT INSPECTOR AT ABETONE IN THE FOREST OF BOSCUONGO. THE FOREST INSPECTOR HAS HIS HOME HERE, AS WELL AS OFFICE. THIS IS A FAVORITE RESORT OF THE ITALIANS DURING THE HOT DRY SUMMERS.

deteriorating effect on the condition of the forests.

Just prior to the outbreak of the great war, however, forestry in Italy received a new impetus with the establishment of a much larger and better organized technical force and provision by the government for a greatly increased appropriation for operation and maintenance.

The total area of Italy, including the islands of Sicily and Sardinia, consists of about 71,500,000 acres, which is equivalent to the combined area of the states of New York and Pennsylvania, Massachusetts, Connecticut and New Jersey. Within this comparatively small area, a population of 36,000,000, more than equivalent to one-third of this country is congested.

Of the total area of Italy, only 17.64 per cent is now covered with forests. Italian forestry officials estimate



Photograph by Nelson C. Brown

A VIEW IN THE LUMBER YARD OF A SAW MILL OPERATED EXCLUSIVELY ON WAR ORDERS IN CENTRAL ITALY. WOMEN WERE COMMONLY EMPLOYED IN YARD WORK OF THIS KIND, AS SHOWN IN THIS PICTURE, OWING TO THE SCARCITY OF MEN. THE LUMBER SHOWN IN THIS VIEW IS BEECH. THE BEST BOARDS WERE SELECTED AND USED FOR AIRPLANE PROPELLERS, THE REMAINDER BEING USED FOR TRENCH TIMBER, BARRACKS, ARTILLERY WORK, AND FOR MISCELLANEOUS NAVAL PURPOSES.

that at least 32 per cent of the total area of the country should be covered with forests. The production of wood is only one of the several important factors entering into the necessity for better forestry in Italy. The maintenance of a continuous water flow for her water power properties, for example, is one of the very most important features. The prevention of erosion on the steep mountain sides, is also an important feature of forestry and its function in Italy. Moreover, the aesthetic side of forestry in Italy has not been neglected any more than in this country. In fact, aestheticism plays such an important part in the national life of the people that the development of her forests along this line, combined with its recreational features, are destined to play a very important part in the future of Italian forestry. Already certain state forests have been set aside and designated as summer resort forests, where cutting is only to be permitted to maintain the forests in best condition, and



Photograph by courtesy of the Italian General Headquarters

A HIGH LOOK-OUT FROM THE TOP OF A LOMBARDY POPLAR ALONG THE ITALIAN FRONT. VANTAGE POINTS SUCH AS THIS MADE EXCELLENT OBSERVATION POSTS TO DETECT ENEMY MOVEMENTS.

they are not to be regulated along the usual forestry principles.

Of the 12,565,000 acres of forest in Italy, which is equal to about the total forest area of New York in this country, a large share is located in the mountains. About 6,700,000 acres are classified as being located in the mountains, and about 3,800,000 acres in the lower hills, the remainder being in the valleys and on the plains. Only 3.8 per cent of the total area of forests in Italy are owned and controlled by the Central Government. This



Photograph by Nelson C. Brown

LUNCH TIME ON THE RESERVE LINE AT LOSSON ABOUT A MILE FROM THE FRONT LINES ON THE LOWER PIAVE RIVER FRONT. JUST BEFORE THIS PHOTOGRAPH WAS TAKEN THIRTY-FIVE AUSTRIAN SHELLS WERE DROPPED IN THIS VILLAGE DOING CONSIDERABLE DAMAGE TO THE CAMPANILE TOWER SHOWN IN THE BACKGROUND.

is equivalent to only 270,000 acres as compared to the vast area contained in our national forests, which embraces a total of about 160,000,000 acres.

The municipalities and communes in Italy are very important owners of forest property, the total per cent being 43.2, while the private owners, lumber companies, etc., own 53 per cent of the total area. Large areas of forests are still retained by many old ancestral estates which have been handed down through the same family, for the past several centuries. On some of these estates



Photograph by courtesy of the Italian General Headquarters

DURING A LULL IN THE FIGHTING AT ONE OF THE ITALIAN BATTERIES BELOW CAPO SILE IN ADRIATIC TIDEWATER. ON THE LEFT ARE SOME LARGE NAVAL GUNS PROTECTED WITH SAND BAGS, ETC. THE ITALIAN OFFICER ON THE RIGHT IS PROFESSOR DINO BIGONGIARI OF THE ROMANCE LANGUAGE DEPARTMENT OF COLUMBIA UNIVERSITY WHO WENT BACK TO ASSIST HIS NATIVE LAND ON THE OUTBREAK OF WAR. BACK OF HIM IS AN OUTDOOR DINING ROOM PROTECTED WITH CAMOUFLAGE AND THE WRITER STANDS NEXT TO HIM.

the forests are being handled on scientific principles of forestry, but most of them present an exceedingly poor appearance.

The number of tree species in Italy is probably greater than in any other country in Europe. All of the trees found in the Mediterranean section are to be seen in Italy, whereas on the higher elevations, tree species which are commonly found in Northern Europe, in such countries as Norway, Sweden and Finland are frequently found. The greatest variety is among the hardwoods. But the total variety of species does not compare with those found in this country. For example: It is estimated that there are at least 500 separate and distinct tree species found in this country, whereas in Italy, there are only about sixty. As against about fifty important commercial species, in this country, there are only about eight in Italy. The hardwoods, broadly speaking, occupy 89 per cent of the total forest area of Italy. A good share of this is oak and chestnut forest, the size and general appearance of which is very disappointing to one familiar with the splendid virgin hardwood forests found

in the Appalachian and lower Mississippi Valley sections in this country.

The conifers or soft woods occupy only 6.9 per cent of the total forest area. On this very small area, however, the very best part of the commercial lumber is contained. In fact, some of the soft woods are the only trees which grow to a size comparable in diameter and height to some of our better soft wood stands in this country. These are limited to the higher elevations of the Apennine Mountains and the Alps of Northern Italy. In these limited sections, silver fir and Norway spruce are often found up to 140 feet in total height, and sometimes, from 40 to 50 inches in diameter. Stands of silver fir planted 100 years ago produce 75,000 to 100,000 board feet per acre as a maximum. Some limbwood and tops for fuelwood and the manufacture of charcoal are also yielded from these heavy stands. The remainder of the forest area of 4.1 per cent is made up of mixed hardwoods and soft woods. It is very evident, therefore, that the two seldom grow together.

The oaks are the principal hardwoods found in Italy and there are four species, namely, two white oaks, one



Photograph by Nelson C. Brown

THOUSANDS OF SILVER FIR LOGS CUT CLEAN ON ONE OF THE ITALIAN NATIONAL FORESTS, ALONG THE CREST OF THE APENNINE MOUNTAINS. BEFORE THE WAR THIS FOREST WAS CONSIDERED SO REMOTE AND INACCESSIBLE THAT THE LUMBER COULD NOT BE MARKETED AT A PROFIT. WITH THE USE OF HUNDREDS OF MOTOR TRUCKS AND AN OVERHEAD CABLE SYSTEM, THESE LOGS WERE BROUGHT DOWN AND UTILIZED FOR THE WAR PROGRAM. BEYOND THE FALLEN LOGS AND BEFORE THE YOUNG STANDING TIMBER MAY BE SEEN ROWS OF YOUNG TREES PLANTED IN THE SPRING OF 1916 AFTER A "WAR CUTTING" HAD BEEN MADE.

red oak and one live oak. Cork oak and a few other oaks of little importance, are also found, but, aside from the cork oak, are of negligible value. The two white oaks are the *Quercus sessiliflora* and *Q. pedunculata*. The red oak is the *Q. cerrus*, and the live oak is the *Q. ilex*. Most of these oaks seldom attain a diameter of 20 inches or a total height of 70 feet. Probably 40 to 60 per cent of the total area of oak forests are periodically

cut off at an early age, for the making of charcoal which is in heavy demand in Italy.

The demand for charcoal is probably the greatest single factor preventing better forestry in Italy. Sprout forests of only from fifteen to thirty years of age are frequently cut off for charcoal, and the trees are seldom permitted to grow large enough to yield lumber.

Silver fir and Norway spruce are, next to oak, the most important producers of lumber and forest products in Italy. There are a few fir forests in Calabria, in the toe of Southern Italy, which have been so remote from transportation facilities that the cost of cutting and transporting them to market was greater than the cost of importing lumber from foreign sources. The silver fir and spruce forests are restricted to the higher elevations of the Apennine Mountains and the Alps, bordering Switzerland and Austria. Although restricted in area, these forests grow to such splendid height and size, and so densely, that they are the most important forests from the viewpoint of lumber production in all Italy. Some of the most dense and heavily timbered forests in all

similar names to those used in this country, are of the same botanical family, but they all differ somewhat in the character of the wood, nature of the leaves, fruit and bark.

There are five varieties of the pine family in Italy. They are found growing chiefly along the shore lines of the peninsula. They are a particular feature of the Italian Riviera where they lend a most pleasing aspect to the already attractive landscape. All of these pines are very similar in general appearance, and seldom attain a height of over sixty feet or twenty-two inches in



Photograph by Nelson C. Brown

A HAPPY, SATISFIED, WELL-FED HUNGARIAN PRISONER WORKING ON ONE OF THE ITALIAN STATE FORESTS HIGH UP IN THE ALPINE MOUNTAINS OF TUSCANY.

Europe may be found at an elevation of about 2,000 feet at Boscolungo, Valombrosa and Mandrioli. The spruce is the same tree (*Picea excelsa*) which is so important in lumber production in Sweden, Finland and Northern Russia, and which is widely sold in the English lumber market under the name of white wood. In general characteristics and properties, it very closely resembles the Adirondack or Canada spruce. It has been widely planted in this country for both commercial planting and for decorative purposes. The silver fir is very similar to the balsam fir in the Northeast, but it grows to a very much larger size. Its scientific name is *Abies pectinata*.

All of the trees found growing in Italy which have



Photograph by Nelson C. Brown

FROM LEFT TO RIGHT, THE ITALIAN GOVERNMENT INSPECTOR OF THE FOREST OF BOSCOLUNGO, MR. MARTINETTI OF FLORENCE, MR. CAMILLO PARISINI, CHIEF ENGINEER OF FOREST CUTTINGS FOR THE ITALIAN ARMY, AND PROF. GIUSEPPE DI TELLA OF THE ROYAL FORESTRY COLLEGE AT FLORENCE.

diameter. They yield a soft, light and workable wood which is rather inferior on account of large knots and other defects. They are commonly referred to as "umbrella" or stone pines. Oftentimes the lower branches are trimmed up leaving a short but broad crown which gives the effect of an umbrella. One of these pines is the same Scotch pine, or redwood as it is called in the English lumber market (*Pinus sylvestris*) which is one of the most important lumber producing trees of Europe, and is exported in large quantities from Norway, Sweden, Finland and Russia; Another is the well-known Cembran pine which is held in very high esteem for wood carvings of all kinds, and more especially for the world famous Florentine frames and woodwork so much of which is made and exported from Tuscany in Central Italy.

Next to the pines, the Italian beech (*Fagus sylvatica*) is the most important wood produced in Italy. It is a favorite wood used for making charcoal. It is also used for boxing and crating stock, flooring and for fuel wood. In general appearance, it resembles very closely the beech found in this country, but it grows much smaller and is more defective than the beech found in our native forests of Wisconsin and Michigan.

The Italian poplar is regarded very highly, especially for the purposes of making interior frames of airplanes

and for miscellaneous wood work purposes. It is much stronger and heavier than the native poplar and cottonwood found in this country. There are two species of Italian poplar.

It is estimated that there are over 1,000,000 acres of chestnut forests alone, in Italy. It is composed entirely of one species which, in external appearance, resembles the American chestnut, but which seldom grows to such large size. Its greatest utility is in the production of sweet chestnuts of which around 800,000 tons were produced in Italy during the year 1918, and furnished an



Photograph by Nelson C. Brown

A LOG YARD IN ONE OF THE FOREST OPERATIONS FOR THE WAR PROGRAM. THIS VIEW WAS TAKEN IN THE UPPER CASENTINE VALLEY IN TUSCANY, IN CENTRAL ITALY. NOTHING WAS ALLOWED TO WASTE ON THESE CUTTINGS, THE LUMBER BEING USED FOR BARRACKS, ETC., AND THE SMALL PIECES BEING USED FOR FUELWOOD AND CHARCOAL. EVEN THE LIMBS AND BRANCHES WERE USED FOR TRENCH FACING AND CAMOUFLAGE PURPOSES AT THE FRONT.

important part of the Italian food supply. In fact, it may be truthfully said that most of the Italian chestnut is protected and cultivated more for the production of the nuts than for the production of wood.

The larger size chestnut trees are used for poles, piling, vineyard stakes, barrel staves and miscellaneous lumber purposes. Most of the chestnut forests, however, grow on poor, rocky soil above the vineyards and olive groves, and the individual trees are exceedingly crooked, small and mis-shapen. They are not the kind of tree which lends itself readily to production of good lumber for this reason.

Italian larch (*Larix Europea*) is found only in the Alps of the north, at a very high elevation. It is only found as a scattered tree in the coniferous forests of the Alps and has never played an important part in the lumber markets owing to its scarcity. Its wood is very highly valued, however, on account of its strong, durable qualities.

There is a variety of other woods found in the Italian forests, and only one is of any commercial importance, namely, walnut (*Juglans regia*). This tree is found growing here and there with other kinds of hardwoods.

It is very highly prized as it is a wood of excellent qualities for use in cabinet, high-grade furniture and flooring work. It is even exported to South America where it is held in great demand. It is also used for wood carving, inlaid work, paneling and interior finish.

Other woods are alder, cypress, elm, mulberry, maple, birch, ash and eucalyptus.

Italy is one of the most important lumber importing nations in Europe. It annually brings in about 1,000,000,000 board feet, valued at over \$35,000,000 to make up the deficiency of its local supply. During the war this normal importation was practically shut off, and the native forests were depended upon to supply a large share of not only the normal demand, but for the requirements of the war program, which were exceedingly large in Italy. As a result of this situation, the Italian forests have been very heavily depleted, and whereas they supplied nearly half of the total amount of lumber and forest



Photograph by courtesy of the Italian General Headquarters

AN OLD ROMAN MOSAIC UNCOVERED IN DIGGING TRENCHES ALONG THE ITALIAN FRONT IN THE JULIAN ALPS. IT WAS PROBABLY PLACED HERE ABOUT 2000 YEARS AGO TO MARK THE BOUNDARIES OF ONE OF THE ROMAN PROVINCES OF THAT TIME. ROMAN COINS HAVE ALSO BEEN FOUND IN PREPARING TRENCHES ALONG THE FRONT LINES.

products required in the country before the war, it is estimated that the local production will play only an insignificant part in the future.

First, the spruce and silver fir adjoining the battle-front were cut off, and then the oak, beech and chestnut forests of the northern provinces of Lombardy, Venetia and Piedmont. This was done chiefly to save transportation to the front because the Italian railways were very heavily loaded by the necessities of the war program. They were called upon not only to send troops, ammunition and other supplies to the men at the front, but they were also used for the transporting of English

and French troops to ports on the southern coast where they were embarked for points in Macedonia, Mesopotamia and Palestine. At first, only the largest and best trees were cut, but as these became depleted, the secondary and more inferior trees were cut and the work progressed to the central, and even the southern provinces of Italy. Finally even the forests which had been classified as summer resort forests belonging to the state, had to be cut. The sacrifice of these beautiful forests such as Valombrosa, Camaldoli, Boscolunga, and others, severely hurt the Italian pride in their native forests. But



Photograph by Nelson C. Brown

A LARGE STATE NURSERY AT BOSCOLUNGA IN THE MOUNTAINS NEAR FLORENCE. THE SEED BEDS CONTAIN SILVER FIR WHICH AFTER TWO YEARS ARE TAKEN TO THE TRANSPLANT AREAS AND AT THE AGE OF FIVE YEARS ARE SET OUT IN THE FORESTS. ON THE RIGHT IS AN AUSTRIAN PRISONER EMPLOYED IN WEEDING THE SEED BEDS. ON THE EXTREME LEFT IS PROFESSOR GIUSEPPE DI TELLA OF THE ITALIAN ROYAL FORESTRY COLLEGE SPEAKING TO THE FOREST INSPECTOR OF THE DISTRICT. TO THE LEFT OF THE AUSTRIAN PRISONER IS MR. CAMILLO PARISINI, GENERAL MANAGER OF ONE OF THE LARGEST LUMBER COMPANIES CUTTING STATE TIMBER FOR WAR EMERGENCY PURPOSES.

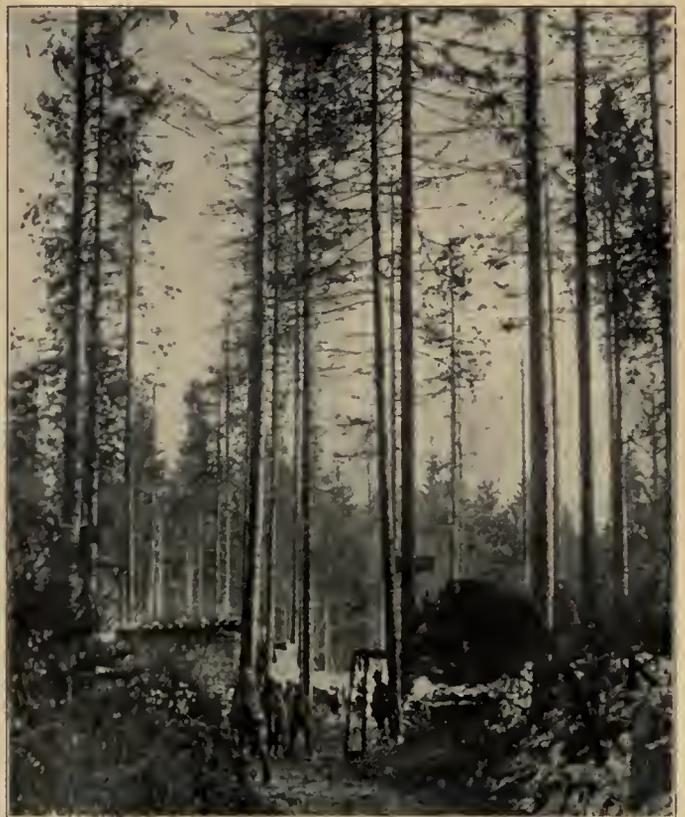
the sacrifice was necessary for the winning of the Great War. The splendid state forests in Tuscany, Abruzzi and even in Calabria, were cut for the maintenance of a big army of 5,000,000 men at the front.

The effect on the Italian forests, therefore, must be very apparent. Italian forestry which was assuming considerable importance prior to the war, has received a serious set back, and damage has been done which will require a century or more to replace.

The personnel of the Italian forestry service, which is known as the "Servizio Forestale," is exceedingly high. It has a number of excellent, trained specialists on various phases of forestry, and it compares very favorably with the service of any of the other European nations. Prior to 1910, the Service received only meager support from the government as the annual appropriations only amounted to \$150,000. However, since that year, the annual appropriations were raised to 5,000,000 lire which is equal to about \$1,000,000. By way of comparison with our forest service in this country, which has, roughly,

about five and a half million dollars for an area of 160,000,000 acres, this is exceedingly good. Since the entrance of Italy in the war, however, in 1915, the annual appropriation was cut to 3,000,000 lire, which is equal to about \$600,000. These amounts include the support of the Royal Forestry College at Florence, and two ranger schools. The schools had no students on their rolls, during the war. The Forestry College received an equivalent of about \$40,000 annually both before and during the war. It was founded as early as 1869 at Valombrosa, and it continued there at the old monastery until 1911 when it was moved to Florence. The two ranger schools are located at Valombrosa and at Citta Ducale in the province of Abruzzi. The former had 150 students before the war, and the latter, 300.

The organization of the Italian Forestry Service consists of the director general in charge, who has his headquarters in the Ministry of Agriculture at Rome. Under him there are 13 chief inspectors, 47 inspectors, 28 assistant inspectors, 16 head rangers, 175 rangers, 425 brigadiers and 2,400 guards. The Forestry Service has



ON THE ASIAGO PLATEAU A SHORT DISTANCE FROM THE FRONT LINES WHERE SMALL PATCHES OF SILVER FIR AND NORWAY SPRUCE, PROTECTED BY THE TOPOGRAPHY, HAVE SURVIVED THE SHELL FIRE AND CUTTING FOR WAR PURPOSES. NOTE THE GREAT MASS OF BARBED WIRE ENTANGLEMENTS READY TO BE THROWN ACROSS THE ROAD IN CASE THE FRONT LINE IS BROKEN THROUGH BY AN AUSTRIAN ATTACK.

recently announced that wounded soldiers will receive preference for all of these positions in so far as they are physically able to perform them.

During the year 1914, the total receipts from the state forests was 1,309,427 lire, whereas the expenses were only 1,148,371 lire, leaving a net profit of 161,056 lire, which is, roughly, equivalent to about \$32,000.

In the management of the Italian State Forests, silver fir has been demonstrated to be the most successful tree. Its chief advantages are that it is easily regenerated; it grows rapidly; it is comparatively free from insect and other attack, and it yields a wood of excellent quality for the lumber market. It is usually cut at from 90 to 100 years of age, and the areas are replanted immediately with five-year old trees. The latter are kept two years in a seed bed, and three years in transplant beds. They are spaced one meter apart each way, and it costs from about 26 to 30 lire, or roughly, from \$5.00 to \$6.00 per thousand trees for reforestation. An improvement cutting is made every ten years. Since the forestry policy was instituted in Italy in 1867, and down to June 30, 1912, 39,932 hectares or about 100,000 acres of forest land has been reforested at an expense of 15,085 lire, which is equivalent to about \$3,000,000 according to the official Italian statistics. The forestry officials have approved a reforestation policy of 81,764 hectares or about 200,000 acres, which only awaits funds for rapid execution. It is estimated that over 1,000,000 acres of forest have been completely destroyed and devastated along the Italian front during the war, and it is believed that the only solution to the difficult problem is reforestation.

To supply her enormous lumber needs Italy can now look to only Switzerland, the United States and Canada. Before the war she imported about 75 per cent of her lumber from Austria and about 7/9 of her wood pulp from Germany and Austria. Switzerland is normally an importer of lumber and can not long keep up its export, so that Italy will probably have to depend upon this country and Canada for all we can possibly send her.

Before the war Italy's home production of lumber was far short of her needs and great quantities of soft wood especially were imported. Since the war the situation has become more serious, all the more so because the war was fought in the precise region of Italy that is richest in soft wood. Not only the damages of war but the uneconomical use caused by the urgency of the demands for lumber for war needs caused the disastrous depletion. Soft woods and poplar in the war zone are said to have been forced to yield two or three times their normal production.

The new provinces to be added to Italy as a result of the war will give her new forestal riches, especially as most of the wood in the added territories is of the kind not common in Italy. But it is hardly sufficient to decrease even slightly the gravity of the situation and Italy must import large quantities of lumber in the coming years because of the increased demand of her industries and the necessity of rigorously sparing the forests situated within her old confines to allow them time for regrowth.

N. L. CAREY, forest assistant in the Olympic National Forest, has discovered what he believes to be the largest spruce tree in the world. It measures 16 feet in diameter 4½ feet above the ground. It is on the south side of the Solduck River. The top was broken off 150 feet above the ground.

THE FIR

By Donald A. Fraser

O Forest Fir!

Standing so straight and so slender,

Gigantic, yet slender;

Spreading thine arms so benignly

In benison over thy kindred,

Why dost thou shiver and groan,

And moan like a spirit in anguish?

Dost hear the far axe being sharpened,

The blades that shall sever thy heart-strings,

And lay thee a-low in thy glory?

Moan not; for to all comes a season

When Earth calleth back what was
borrowed;

So he who shall shatter thy life-dream,

In turn shall his life-dream be shattered.

Then moan not, O Forest Fir slender,

And groan not in anguish and sorrow;

But stretch forth thine evergreen fingers

And touch on the strings of the wind-harp

A melody sweet and caressing,

A pean of love and forgiveness;

And breathe o'er the world so ungrateful

Thy resinous odors of healing,

Right on till the axe shall incise thee.

Perchance when thy last groan is uttered,

And the thunderous crash of thy death-
plunge

Shall melt in the aisles of the forest,

That God will begin a new era

For thee, a new lease of achievement;

And thus thy proud death shall accomplish

Far more than thy bourgeoning life-span,

O Forest Fir,

Standing so stately and slender!

THE GUARDIAN OF OUR FORESTS

BY ALICE SPENCER COOK

“UNCLE Sam’s handy man” is what we call the forest ranger, the man who guards our National Forests, for his duties are probably more varied than any other officer in the Government Service. His life and activities are much of a mystery to the average citizen. Even in the western States where the National Forests are largely located, little is known of the men who protect the timber resources of the State, watch over the water courses and the game and stock, and patrol in general the great mountain reaches.

When the Service was new, the only qualifications demanded of him were those of a woodsman or a cowboy. “Book learning” was unessential, so long as he could swing an ax and ride a horse. He blazed the trail through untrod forests and over unnamed peaks, but he was not up on the “technical” stuff and, with the buffalo and bison, the pioneer and his prairie schooner, he had to go. The advancing strides of civilization demanded a scientific knowledge of the woods and engineering ability and forest schools soon turned out the requisite number of these college trained men, whose education in the theory of the management of the forest, supplemented by practical experience in

various lines of woods work, made them capable of performing their varied duties.

So the ranger has gradually developed from the uneducated, though faithful, frontiersman, to the clear-eyed, weather-bronzed young fellow with a vast amount of initiative and tact, a combination of cattleman, surveyor, timber cruiser, fire expert, telephone linesman, and, most of all, a first-class woodsman.

The little old, weather-beaten shack has given way to a substantial cabin, furnished by the Government, and costing about \$1,000, which is situated near the largest town in his district. These cabins, which are invariably painted green and have “Old Glory” floating above them, are very attractive looking. In addition to a rent-free cabin, the ranger is furnished with all the fuel he requires, so he is never harassed with the coal bills which bring furrows of care

to the brow of many a city dweller. He must, however, furnish his own horse, and a horse to a ranger is as necessary as a ship to a sailor; but pasture is furnished by the Government.

Each ranger has charge of about 200,000 acres, and is assisted by guards, who belong to the old school



Photograph by H. T. Cowling

HERE IS FOUND REALIZATION

Easy of access, what could be more soul-satisfying to the lover of beauty than this view of Lake Chelan at evening? Lake Chelan is in the Chelan National Forest, guarded by our rangers.

which demands brawn in addition to brain. One of his duties is to lay out the mountain trails, which he does with great engineering precision, oftentimes, of necessity, through thick underbrush and up steep mountain sides.

He puts in the telephone lines, which, as will be seen later, are absolutely essential in the safe guarding of the forests, and on the forests where there is grazing, he has supervision of the Government grazing permits, which means that he must assist in protecting the sheep from wolf attack, make proper watering places for the stock, and see that the herders move their stock on other grazing lands before the grass is eaten so short that it will not come up again. He must also count the sheep, checking them for loss and for pasturage charge. He supervises in part the timber sales, cruising or making an estimate of the timber, and, after it is cut, scaling it so that the Government will derive the proper income from it.

He welcomes the campers who enter his domain, advises them of the safest trails, the best fishing streams, and the happy hunting grounds, which in this case

does not mean the Indian's paradise, at the same time warning them, very politely of course, as becomes a model host, not to leave their camp fires burning.

Near Portland and Seattle, there are two immense national playgrounds, which are open to the public for

camping purposes. The public is invited by folders, advertisements, etc., and is more than welcome to camp there for any length of time. For their convenience, the rangers erect, here and there, stone fire places for cooking purposes, and sees that the campers are supplied with quantities of wood for fuel. It is the

boast of the ranger that the water in the mountain streams is pure and fresh, and he makes good his boast by keeping the streams free of refuse of all kinds.

One playground, 47 miles from Portland, Oregon, on the highway which extends along

the Columbia River, is visited every pleasant Sunday by from 2,500 to 3,000 people, some to spend the day, and some the week-end or longer. They fish, hunt, or wander along the trails back into the mountains, whose wild and rugged beauty is balm to the heart of the city dweller. Fre-

quent signs tell where the trails lead and rude but storm-proof cabins, supplied with fuel, are erected at frequent intervals, as a refuge when lost.

The Government also issues free use or nominal charge permits to anyone who desires to put up a hunting lodge, and is given a piece of land, com-

prising about an acre, for this purpose. Timber for the cabin is furnished free of charge and is never missed, for in the Northwest there are from 50,000 to 200,000 feet of timber to the acre, and 5,000 will build the average house; there is enough timber on every



IN THE DARK WATCHES OF THE NIGHT

A wonderful cloud effect in the forest.



READY TO MAKE CAMP FOR THE NIGHT

The many visitors to the National Forests appreciate the value and necessity of the work done by the forest rangers, ever alertly on guard, day and night.

acre to build from 10 to 40 houses. These permits are usually taken up by people in Washington and Oregon who wish to spend a few weeks or months in hunting and fishing. The tourists from the East usually take the main traveled roads, instead of the untried trail dear to the heart of the true Westerner.

It is a curious fact that approximately 75 per cent of the rangers are married to school teachers. You will wonder where all the school teachers come from in this sparsely settled region. This is partly explained by the fact that every district has at least one teacher, regardless of the number of pupils. Since 25 per cent of all receipts from the National Forests go to the counties in which they lie, to be used for schools and roads, they can well afford to employ a teacher at an attractive salary. An additional 10 per cent is expended by the secretary of agriculture upon the roads and trails constructed primarily for the benefit of settlers within the forests. In one district in Washington, there are but two "children," one a boy of 22 years of age, the other a girl of nine. These children are half breeds, their mother a full-blooded Indian, the father a white man, a

lated districts. The teacher lives with the family for the nine months of the school year, in their little wick-i-up, 18 miles from the nearest railroad. This may sound very romantic until one remembers that the



HOME OF A RANGER

Typical ranger cabin in the less mountainous districts, Washakie National Forest, Wyoming.

Indians in that part of the country are not the "six-foot in their stockings" type, which romance and the movies love to picture. They are short and heavy set, and many of them are blind, owing to their unsanitary mode of living. They are neither energetic nor industrious, and are quite content to live in rude little huts, made by bracing a few logs against each other, and in these huts they live all winter long, with only an open fire to keep out the bitter cold. They live on fish, mostly salmon, which come up the mountain streams in the spring, mid-summer and fall, to spawn, but never get back to the ocean, as those which are not caught are dashed against the rocks and killed, or, having accomplished their purpose in life, die



AN UNUSUAL BIT OF SCENERY IN A NATIONAL FOREST

Spruce trees, with crowns whipped into peculiar, fantastic shape by the winds.



RANGERS PLANTING FISH

The rangers co-operate with the State fish and game commissions and are instrumental in planting, in the mountain streams, billions of fish fry, which play no unimportant part in the food supply of the country as well as furnish a means of recreation for city sportsmen.

"squaw man," as he is scornfully called in that section of the country. But these youngsters receive individual attention seldom accorded to children in the more popu-

a natural death. The Indians dry the fish which they catch by hanging them on the sides of their cabins.

These mountain streams are also well stocked with trout planted there by the rangers. The minnows are



BUILDING A TRAIL UNDER DIFFICULTIES

Frequently, in order to maintain the proper grade of a trail, it is necessary to remove obstructions of various kinds, such as trees, rocks, and even immense boulders, sometimes larger than the ordinary dwelling house. In the last case, this is accomplished only by the use of dynamite.

furnished by the state fish hatcheries and are sent out in 10-gallon milk cans, which the ranger takes up the streams on eight or ten pack horses. And thus, the supply of trout is renewed each year and is ever abundant for the campers.

In some of the National Forests, the rangers have attempted to secure the utilization of wild fruits in their communities by organizing picnics for the purpose of gathering these fruits. In the mountains of the Southwest, there are large quantities of wild grapes and cherries which make excellent jellies, while in Washington and Oregon, wild strawberries and huckleberries are found in great abundance.

But the chief duty of the ranger is to guard the forests from fires and fight them when they occur. During the course of the fire season, there are sometimes as many as 500 fires in a district, ranging in size from a few square feet to hundreds of acres. Owing to the unusually dry season and the many logging operations now located adjoining national forest timber, the number of forest fires, and danger from

them has greatly increased. You will wonder how so many fires could be started in the forests, far from human habitation. These are the three chief causes: railroads, campers and lightning.

It would be impossible to properly guard the forest were it not for that modern miracle, the telephone. There are from 40 to 100 miles of telephone line in each National Forest, extending along the principal tracks



READING SNOW SCALE

This is important since the amount of snow fall determines to a great extent the fire hazard for the following summer, as well as the supply of water available for irrigation purposes.

used by miners, campers, etc., and on up to the lookout stations on the mountain tops. Three of these lookout stations are situated on mountains over 10,000 feet high, which for 2,000 feet from the top are perpetually covered with ice and snow and resemble huge ice cream cones. And there, thousands of feet beyond the timber line, in little cabins, or lookout stations, carried piece by piece up the steep mountain trail, men are stationed all through the fire season to



RANGER COUNTING SHEEP

A band of sheep at Dutch Joe Corral, Bridger National Forest, Wyoming.

watch for the thin spires of smoke which mean the beginning of a forest fire.

When a fire is lighted, sometimes 25 to 30 miles away, he estimates its exact location by means of instruments for that purpose, and then calls up the ranger, who immediately rushes to the scene of the fire all the men at his disposal. If the fire promises to be more than a small one, he telephones or telegraphs to the nearest city for help. In case of a very bad fire, several hundred men are hurriedly gotten together and hastened to the fire. Fire fighting instruments and cooking equipment are already on hand and every one works day and night till the fire is under control. Not long ago, a fire was started by lightning way back in the mountains, 15 miles from the nearest habitation. In the course of an hour and a half after the fire had started, or at least after the smoke had risen through the trees, the ranger had

five telephone calls informing him, not only of the fire but also of its exact location. This shows how closely the forests are guarded and explains why most fires are not more serious than they are. But even with the greatest precautions, a smouldering fire left by careless campers, sparks from the smoke-stack and live coals from the fire of a passing train, or a lighted match thrown in some inflammable material in the forest, combined with an east wind, will often wipe out in an hour what nature has taken hundreds of years to create. And not one in a hundred upon reading the startling headlines in his favorite daily, "Millions in Lives and Timber Lost," realizes the brave fight that is made to keep this loss down. But what of the khaki-clad ranger, who with eyes quick and keen, dices with death in a losing game? He is "among the missing," and it's all in the day's work.

NATIONAL HONOR ROLL, MEMORIAL TREES

Trees have been planted for the following and registered with the American Forestry Association.

BERKELEY, CAL.—By Luther Burbank Intermediate School: Edward Werner, John Gazanago, James Gimbel, Rollie Ramos, Martin Dall, Cladius Vinther.

MIDDLETOWN, CONN.—By Dr. Kate C. Mead: Arthur Leonard Johnson.

NORWICH, CONN.—By W. I. T.'s First Congregational Church: William Morgan Durr; by Mrs. James L. Case: William E. Perry.

WASHINGTON, D. C.—By Mrs. George Combs: The Patriots of the War.

COMMERCE, GA.—By First Baptist Church: Ellis Luthi.

TIFTON, GA.—By Harding Methodist Church: Joe J. Moncrief, Richmond Lovett.

KASBEER, ILL.—By Public Schools: Claus Larson, Walter Paden.

MURPHYSBORO, ILL.—By Public Schools: Will Connelly, Will Richards, Peter Weber, Ernest H. Rowald, Thaddeus Lee.

ROCKFORD, ILL.—By Memorial Tree Committee: Theodore Roosevelt, Soldiers and Sailors of Rockford.

SPRINGFIELD, ILL.—By Enos School: Miss Alice K. Flower.

WHITE HALL, ILL.—By White Hall Senior High School: Francis Grimes; by White Hall Round Table: Charles Martin.

CLAY CITY, IND.—By Betsy Ross Club: Robert Andrew, Edwin Shonk, Samuel Knipe, Jacob Miller, Russell McGriff, Albert Werremeyer.

EBENEZER, IND.—By Miss Cora Grapy: Elmer Andrews.

ELIZABETHTOWN, IND.—By Women's Welfare Club: Kent Voyles.

INDIANAPOLIS, IND.—By Country Club: Lieut. H. C. Colburn, McCrea Stephenson, Reginald Wallace Hughes; by Arsenal Technical High School: Alfred Sloan, Franklin Burns, Ralph Burns, Ralph Gullett.

MUNCIE, IND.—By St. John's Universalist Church: J. R. Hummel.

COUNCIL BLUFFS, IOWA.—By Second Presbyterian Church: Lieut. Richard E. Cook, The Honor Roll.

HARTFORD, KY.—By Mrs. S. O. Keown: Boys from Ohio County, Kentucky.

PADUCAH, KY.—By Robert E. Lee School: Norman E. Lovell, Harry Cornwell.

HARWICK, MASS.—By Park Commissioner: Leslie M. Clark, Valmer H. Bassett, Earle M. Chase, Clarence L. Berry, Josiah D. Nickerson.

MARBLEHEAD, MASS.—By Tree Warden Stevens: Lieut. Charles H. Evans, Irving E. Brown, John A. Roundy, William F. Farry.

RANDOLPH, MASS.—By Stetson High School: Lieut. John B. Crawford, Thomas D. McEnelly, Daniel J. McNeill, Lieut. Thomas W. Desmond, Charles G. Devine.

READING, MASS.—By Reading Park Commission: Ernest H. Leach, Clarence S. Eaton, Lieut. Edward J. Haines, Stanwood E. Hill, Thomas E. Meuse, Timothy E. Cummings, William A. Riley, Corp. Edward Walsh, Ralph E. Morey, William A. White, Sgt.-Major William G. Britain, Jr., Carl L. Coombs, Sgt. Chester G. Hartshorne.

EAST LANSING, MICH.—By Michigan Agricultural College: R. S. Welsh, I. D. MacLachlan, F. E. Leonard, W. R. Johnson, L. Cronc, A. F. Edwardsen, W. T. McNeil, H. J. Sheldon, T. W. Churchill, E. E. Ewing, N. F. Hood, D. McMillan, E. E. Peterson, F. I. Lankey, D. A. Miller, L. P. Harris, S. D. Harvey, H. R. Siggins, L. J. Bauer, G. W. Cooper, F. H. Esselstyn, L. K. Hice, C. M. Leveaux, G. S. Monroe, J. S. Palmer, W. H. Rust, O. N. Hinkle, O. C. Luther, L. T. Perrottet, B. F. Smith, G. J. Williams, H. B. Wylie, E. Halbert, S. R. McNair, W. B. Lutz, O. W. Wissmann.

LANSING, MICH.—By Eclectic Society of M. A. C.: George Monroe, Hugh Wiley, Samuel McNair.

MOUND, MINN.—By Public Schools: George Kohler, Martin Shabert.

LAUREL, MISS.—By Dr. W. P. Davis: Lieut. Marvin Stainton, D. S. C.

BOWLING GREEN, MO.—By Reading Club: Erritt Sidwell.
FORT OMAHA, NEB.—By United States Army Balloon School: Maurice A. Reed, Oscar F. Lindh, Frank A. Kaczkowski, Frederick T. Kaulitz.

CAMDEN, N. J.—By Whitman Improvement Association: Walt Whitman.

ELIZABETH, N. J.—By School No. 15: Theodore Roosevelt, Vincent Carroll.

RAHWAY, N. J.—By Mrs. Leillie Burt: John Franklin Burt.

BROOKLYN, N. Y.—By American Association for Planting and Preservation of Trees: Louis Goldberg.

MOUNT VERNON, N. Y.—By Jefferson School: Theodore Roosevelt.

SYRACUSE, N. Y.—By Oakhurst Grammar School: Howard Levy.

CINCINNATI, OHIO.—By Cummins School: Robert Schroder; by Linwood School: Albert Mider, Grant Long; by General Protestant Orphan Asylum: Charles Banger, Charles Stratmeyer.

COLUMBUS, OHIO.—By the Altrurian Club: Sgt. W. E. Wolfersberger.

NEW LEXINGTON, OHIO.—By Mr. A. D. Fowler, Scout Master: Theodore Roosevelt.

“ROADS OF REMEMBRANCE”

IN THE days when all Gaul was divided into three parts the wise men knew the value of good roads.

The Appian Way, built in 312 B. C., is still an excellent highway and France today has good roads, for she began building them in 1556. In 1820 Macadam, the English highway engineer, introduced his methods into France. In this country, however, the good roads idea had to pass through the “crank” stage and then the “enthusiast” stage until now the country has a road building program under way that will cost about a half billion dollars, counting state and federal activities. Good roads have suddenly become a business proposition and they should also become a basis for the beautification of the country and something more than a strip of concrete baking in the sun in summer and smothering in the snow

bridges and libraries, all to be included in one country-wide plan or unit.

Here in our own country Minneapolis has the greatest plans for a memorial drive under way, for the Board of Park Commissioners there is planning for fifty years from now. Theodore Wirth, the superintendent, is going ahead with plans by which he claims Minneapolis will have one of the show places of the American continent in 1950. Improvement of the Glenwood-Camden Parkway has been begun and C. M. Loring, “the father of the park system of Minneapolis,” has set aside \$50,000 for the care of the trees. The vase type of elm is to be used and these trees are now being shaped in the nurseries in order to be ready for planting in the spring of 1921. There will be six rows of trees for



DEDICATION CEREMONIES

Thirty-six trees were planted at the Michigan Agricultural College in honor of the graduates who gave their lives in the war. A memorial tablet imbedded in a big boulder was unveiled.

drifts in the winter. To avoid this the American Forestry Association has pointed, as a solution, to “Roads of Remembrance”—the planting of memorial trees, memorial groves and even memorial forests at such places as are deemed best. We hear much of memorials but why not let memorial of stone wait until the proper setting along a “Road of Remembrance” can be found?

Memorial tree planting on a big scale is planned according to William Carroll Hill, secretary of the Pilgrim Tercentenary Commission, in connection with the three hundredth anniversary of the landing of the Pilgrims in 1920. Daniel Boone died in 1820 and as there is now a Boone Memorial Highway the American Forestry Association has suggested that memorial trees be planted along the road to mark the centenary. There are several proposed highways in honor of Colonel Roosevelt, the leading apostle of the great outdoors. In Great Britain memorial plans are of the widest scope, for they include housing, “Roads of Remembrance,”

nearly two miles and four rows of trees for one mile. The trees will be planted 60 feet apart in both directions. Cincinnati, too, has under consideration a wonderful plan for a memorial drive that includes the widening of Fifth Street in the down-town section, and connecting up with a boulevard now in existence. James P. Orr, who, with F. W. Garber, the architect, was first to suggest the plan is enthusiastic for memorial tree planting.

In Canada, the Ontario Highway Association has plans up for a highway from Ottawa to Sarnia, across the river from Port Huron, where the Victory Highway cuts across Michigan. This in turn connects with the Lincoln Highway which crosses the Jefferson Highway near Ames, Iowa. The Jefferson Highway runs from New Orleans to Winnipeg. Thus it will be seen there are great possibilities for memorial tree planting along an international drive. The tree planting in Michigan is assured and the stretch of the Jefferson Highway in

Louisiana has been planted with Victory Oaks. Governor Pleasant of Louisiana, and a party of motor enthusiasts, have just completed a run from New Orleans to Winnepeg.

Memorial tree planting this fall will be done on a bigger scale than ever before. Inquiries have been coming into the Association for three months in regard to proper planting and the registration of the trees on the national honor roll. From every section of the country requests are coming for the bronze marker to identify the individual tree. East St. Louis has big plans under way for tree planting, and plans are going forward to interest the entire city by planting memorial trees and thus allowing the citizens themselves to have a big part in beautifying the city. Mayor Henry B. Chase of Huntsville, Alabama, has just informed the Association that the Grace Club, of which Mrs. Owen Graham is president, plans a memorial avenue for fifty-four boys from that county who lost their lives. The town of Southwest LaGrange, Georgia, has memorial tree planting



plans under way, so Mayor C. O. Coleman advises. The Bingham, Mexico Chapter of the Daughters of the American Revolution, of which Mrs. S. J. Whitney is the regent, has planted a large number of memorial trees. The Michigan Agricultural College has dedicated 36 trees in honor of men from that school and Prof. A. K. Chittenden has sent in the names for enrollment. The city of Dallas will take up memorial tree

The picture in the center is of the famous elm at Huntington, Indiana, which was saved by changing the plans of the Christian Science Church there. The picture in the oval and the one below, by the Times-Star, show the possibilities of a "Road of Remembrance" planted with Memorial Trees, similar to the plan Cincinnati now has under consideration.

planting on a big scale, Alfred MacDonald reports, and the *Evening Post*, of Worcester, Massachusetts, has taken up the campaign there for a memorial grove. Prof. F. A. Boggess, of the University Hall School, of Boulder, Colorado, reports a very interesting program in connection with the dedication of a memorial tree in honor of four former students who gave their lives to their country. An avenue of flags leading to the tree was a unique feature of the program in which the pupils took part. Schools and colleges are taking up memorial tree planting extensively not only in honor of students and graduates but to mark their own graduation. Thus it will be seen these classes will have trees of their own to come back to at the reunions held ten and twenty years later.

Lester Park, the most beautiful and best known park in Ogden, Utah, was, in April, the scene of a very unusual ceremony in the annals of the Forest Service. The members of the office of the District Forester, located in that city con-

gregated in the park for the purpose of observing Arbor Day and to pay respect to the memory of three co-workers in Forestry who sacrificed their lives in the world conflict. Forest officers are particularly interested in the planting of and caring for living trees, and a fitting method of honoring

them was believed to be in planting trees, since two of the men had especially fitted themselves for this particular line of work and the other was an active member of the Forest Service at the time of his death. These three men were Captain Homer S. Youngs, Lieutenant Hubert C. Williams and Forest Ranger Rudolf E. Melenthin. The first two died in France and the last was killed while arresting a draft evader.

District Forester L. F. Kneipp, who made the principal address, said in part:

"There are few things that man can do to show his faith, his gratitude and his ideals which are more simple than the planting of a tree—and yet, there are few things that are more effective. A tree is a living memorial, often more enduring than marble or bronze. A tree is a thing of beauty and of inspiration; a living token of the wonder and glory of nature; a symbol of service.

"For the life of a tree is a life of service. It gives a touch of beauty to a barren waste; it enriches the ground upon which it stands and protects it from the destructive elements; it affords the birds of the air a nesting place and

shelter from the storms; it tempers the keen edge of the blizzard and the blasting touch of the drouth; its buds and its leaves are marvels of decorative beauty, and its fruits a source of sustenance and life. Even the end of life is not the end of a tree's service; to the contrary, the end of life opens new fields of service and utility which add immeasurably to our civilization and our culture and our happiness.

"Because this is true, it follows naturally that one who loves trees must love beauty and unselfishness; must cherish high ideals and lofty traditions. The mere planting of a tree is an example of unselfish service, for few men can live to enjoy the full fruit of their labor and none can help but share the reward with their fellowmen.

"It is not surprising that when the call came to save the world from the threat of barbarism the men who loved trees, who worked among trees, were quick to respond. It is not surprising that men like Youngs and Williams and Melenthin gladly sacrificed themselves that their ideals might endure, ideals that to them meant more than life itself.

"Nothing that we can do to honor their memory; to display our gratitude and appreciation, could be more fitting than that which we are doing to-day. May we not hope that these trees we are planting here will stand for generations, living memorials, not only to these men who made the supreme sacrifice, but also to the ideals which they cherished and for which they gave their lives?"

At the conclusion of Mr. Kneipp's address, a black walnut tree was planted in memory of



MEMORIAL TREES PLANTED FOR FORESTRY BOYS

District Forester Kneipp, Assistant District Foresters Fenn, Morse, Metcalf and Woods and other members of the United States Forest Service observing Arbor Day and commemorating fallen heroes by planting black walnut trees in Lester Park, Ogden, Utah.

each of the three men and a short history of the life of each was given by a member of the Service.

The people of the country are all interested in trees as never before. Through tree planting they will see the value of groves, through groves they will see the value of forests, through forests they will quickly see the value of a national forest policy. The ground work for big things is being put in place by the Association. Every member can have an important part in this work by co-operating. Tell your friends of the work of your association. Keep your editors informed. Take the lead in tree planting in your own community. The American Forestry Association has ready an ideal program for a tree planting day and wherever you see such activities planned, inform those in charge that your association will be glad to help in every possible way. Each member will get out of the association just what she or he puts in it. The opportunity for returns in satisfaction, in the promotion of the community spirit which bloomed during the war, and in the betterment of your country, were never greater than in co-operation at this time in the work the American Forestry Association has before it. Let there be many trees as a memorial to your endeavors.

A NATIONAL FOREST POLICY

AMERICAN FORESTRY MAGAZINE HEREWITH PUBLISHES SOME MORE OPINIONS REGARDING THE NEED OF A NATIONAL FOREST POLICY AND THE KIND OF A FOREST POLICY PROPOSED BY UNITED STATES FORESTER, HENRY S. GRAVES. COL. GRAVES' OUTLINE OF THE PRINCIPLES OF SUCH A POLICY WAS PRINTED IN THE AUGUST ISSUE OF THE MAGAZINE. FORESTERS, LUMBERMEN AND TIMBERLAND OWNERS THROUGHOUT THE COUNTRY HAVE BEEN INVITED BY THE AMERICAN FORESTRY ASSOCIATION TO EXPRESS THEIR VIEWS ON THIS VITALLY IMPORTANT SUBJECT.—Editor.

FOREST ECONOMICS: SOME THOUGHTS ON AN OLD SUBJECT

BY WILSON COMPTON

SECRETARY-MANAGER, NATIONAL LUMBER MANUFACTURERS' ASSOCIATION

NO well-informed American denies the need for a national plan for efficient forest utilization and adequate replacement of timber. But this is only the statement of a *problem*, not of its *solution*. Although there may be general agreement as to the nature of the problem, a veritable encyclopedia of argument and discussion might not suffice to secure agreement as to the answer.

Most of the public discussion of Forest Policy has heretofore originated among the foresters. Some of the policies publicly advocated may represent the general opinion of the profession. "Public opinion," however, we have learned, is not the opinion of the most people but the opinion of those who talk the most, or the loudest. It is therefore of doubtful propriety to attribute to the profession as a whole the sensationalism and faddism of a few men having apparently no permanent attachment to a substantial forestry enterprise, whose concepts of forest economics are apparently quite unsoiled by contact with the facts of industry, and whose self-constituted interpretation of the public interest is vague and mocking.

As a plain citizen, interested in whatever will promote national welfare, I am glad to contribute what I can to clearing away the haze which, it seems to me, has for years enveloped the discussion of future forests and timber supplies, in relation to the industrial life of America. In the discussions of this in recent years, it seems to me, a number of points have frequently been overlooked and other points of doubtful validity have been sometimes taken for granted.

A mere enumeration of these with a brief and rather abrupt explanation is all that a short space will permit. The future permanent supply of standing timber as a raw material for industry is a problem of economics. How much timber, what kinds of timber, where it should be located, what lands should be timbered, and how the timber should be used, cannot be determined by applying principles of forestry. These questions will be correctly answered only by appeal to the experience of business and industry, in the light of all the complex economic needs of the nation and in consideration of the experiences of other countries under similar circumstances. When the nation's timber needs have been determined—then the principles of forestry correctly applied may show how these needs can best be met.

Whether or not it is good forestry to have forests for the sake of having trees, it is not good economics. Forestry cannot safely construct its own kind of economics without considering the nation's needs for the products of all other industries, which are taken from the same land which might otherwise grow trees, and which are made by the same labor which might otherwise make wood products—and then assert that a program of forest renewal based thereon is a correct interpretation of the public interest.

Fourteen Points to Consider.

To anticipate the probable denial by some reader that the points here commented upon have ever been advocated by any conservationist or by any forester, I wish to say that each one has been advocated to me either in personal conversation or in correspondence. I have never had, however, the impression that the views held by some "conservationists" and some foresters actually represented the views of their respective professions as a body.

1. Possession of cheap and plentiful timber is not necessarily a symptom of national wealth.

The great forests of original timber did and do add greatly to national wealth. But a permanent policy that would perpetuate the original quality of merchantable timber or any large proportion of it might, and probably would, involve a national waste through employing soil, capital and labor for a less profitable use when a more profitable use was available. Low prices for forest products at the expense of relative scarcity and high prices for other commodities is not safe public economy.

2. Removal of original forests from the soil of the United States without provision for forest renewal on most of the land thus cleared is not necessarily a national misfortune.

Classification of land in the light of all the complex agricultural and industrial needs of the nation is basic in any rational plan. The scarcity that is most impressive nowadays is not the scarcity of trees, but the scarcity of trees *near to the centers of lumber consumption*. But although impressive it is not conclusive. It is by no means improbable that a comprehensive survey of the needs of forest industries in the light of all other industrial needs would show that the public interest will best be served if the permanent commercial stands of timber are confined to the mountainous country of the Far West, the Appalachian and White Mountain region, and rough country elsewhere. It might be exceedingly wasteful, for example, to maintain under forest more than a small proportion of the cut-over Southern pine lands. Certainly the ambitious South would resent an effort to maintain the South permanently as an in-

dustrial frontier, such as has been its substantial status heretofore.

There is neither reason nor truth in the slogan that: Where a tree is cut another tree should be grown. Such a policy, pursued throughout this land, would entail great waste in the use of the nation's resources. It is the thoughtless cry of those who believe that nature left unaided and undisturbed should be the universal regulator of the economic life of mankind.

3. The fact that old trees are being cut down faster than new trees are growing up does not of itself signify public loss.

It may mean the diverting of some of the productive energies of the nation into more profitable channels than would be offered by the forest industries. The United States is passing through the same evolution of changing lumber requirements experienced by many other countries. During the past 15 years the per capita annual consumption of lumber has declined from more than 500 board feet to approximately 300 board feet, as against 150 feet in Germany immediately before the war, 102 feet in England and 90 feet in France.

4. The virtual disappearance of certain species of timber is not necessarily detrimental to public welfare.

For commercial purposes many species are readily interchangeable. Practically the same things which are now made from a hundred commercial species could be made and the same uses and comforts derived therefrom—from a dozen different species well selected for permanent growth. The elimination from commerce of certain species, provided adequate substitutes are preserved, would involve no necessary impairment of public wealth.

5. Not only is it not *necessarily*, but it is not even *probably* true, that all the lands in the United States better suited for growing trees than for growing anything else, should be used for growing trees.

To use an extreme contrast: If 95 per cent of the land of the United States were better suited for pasture land than for any other purpose would 95 per cent be used for that purpose and we become a nation of herdsmen? Or, if 60 per cent of the area of this country were better suited for growing trees than for agriculture or stockraising, would 60 per cent be so used and the United States then have lumber enough to house five times the number of people it could feed?

But this doctrine is being publicly preached as ideal!

6. The disappearance of forest industries in certain regions because of exhaustion of nearby timber supplies is not necessarily either a local or national misfortune.

Clearing of the land has frequently paved the way for industrial and agricultural expansion which has produced greater wealth than did the forest industries in their prime. It would be a waste of labor, as well as of capital, to attempt to continue an industrial enterprise under conditions which would have returned, as the result of a day's labor, a product worth only \$1,000, when the same labor, and the same amount of capital, under more favorable available conditions of employment would have returned a product worth, say \$2,000.

Surely there is no public economy in making a wasteful use of capital and of human effort. Yet this doctrine is being publicly advocated.

7. Economically the original timber in the United States is in large part a "mine" and not a "crop."

The business of lumber manufacture is no more the business of growing trees than the business of flour milling is the business of growing wheat. Men who buy timber and operate saw-mills are not foresters any more than persons who buy coal lands and operate mines are geologists. The business of the lumber manufacturer is to make boards out of trees and if he

does that well he is performing the best public service that his industry can render.

It is not his business to make more trees out of which some one else some day may make more boards. By fortuitous circumstance the lumber manufacturer is likewise usually an owner of land, some or all of which may have greatest ultimate usefulness in reforestation. But this ownership of potential forest land does not put the owner under obligation—moral, social or legal—to undertake the growing of trees when to do so would be unprofitable, any more than the ownership of potential farm land obliges the owner to raise farm crops when he could do so only at a loss.

If the growing of timber is an appropriate private enterprise, which I doubt, the interest of the public (provided it is well informed) in the maintenance of permanent timber supplies will find expression in some form which will result in economic conditions making profitable private enterprise in growing timber. If it is not an appropriate private enterprise the sooner adequate provision is made for doing it as a public enterprise the better. Public agencies would under such conditions experience no difficulty in acquiring from present owners the lands appropriate for use in reforestation.

Public indifference and inactivity cannot, however, encumber the private owner of timber lands with the responsibility for, or expense of, doing something the public should do, but does not.

8. Local shrinkage of employment for labor, caused by vanishing forest industries in certain regions, has been by no means an unmixed evil for labor.

Employment at higher wages has usually been secured by removal to similar industries in other regions, or to other industries in the same region, the higher prices for the products resulting from increasing scarcity of raw material, making the payment of higher wages possible. Temporary dislocation of labor has always accompanied at some stage the industrial use of exhaustible natural resources.

9. The idleness of some of the cut-over timber lands is the inevitable temporary result of clearing the forests from lands upon which maintenance of permanent forest growth would be poor *public* economy. Agriculture, stockraising or other purposes will eventually absorb these lands.

10. The idleness of other of the cut-over timber lands is the inevitable result of clearing the forest from lands upon which regrowing of a new forest would be poor *private* economy.

If the public needs these lands to be reforested before the time when enlightened self-interest—which is the essential driving force of all business and industry—induces the private owner to engage in timber growing, the public should itself engage in reforestation of lands appropriate therefor.

11. The owner of private property in timber lands legally acquired is under no different or greater obligation to use his land permanently to grow timber than the owner of agricultural land is to use the land to grow crops if the growing of crops is unprofitable. The public need for food is at least no less than the need for lumber. Lands on stony hillsides in remote New England are scratched into agricultural productivity which would not be even sniffed at in the more fertile country of the Middle West.

12. The legal obligation upon the owner of property, an obligation that is universal and should be enforced, so to use it as to do no damage to another's property and to do no public injury, does not include an additional

obligation to make a specific positive use of it such as may benefit the public at large although at individual loss to himself.

Failure to reforest cut-over lands is not to do a public injury. On the contrary, *private* reforestation enterprises today on most of the cut-over land would, on the whole, be a public loss because it would involve a relative wasteful use of the nation's resources of labor and capital.

13. If the public is interested in any use of timber lands or of cut-over lands different from that which the enlightened self-interest of the owner may dictate, the public which is the beneficiary should pay the additional cost.

A single class of private property may not be singled out to sustain a burden, in behalf of the public as a whole, which is not imposed upon other classes of private property.

14. The maintenance in idleness of cut-over land is declared to be wasteful.

The larger truth would seem to be that it is wasteful to maintain cut-over land in such state of idleness as does not furnish safeguard against fire and ravage which destroys the natural reproduction of desirable species.

The idleness itself is not always wasteful. In many instances the expenditure of labor upon such land to return it to productive uses is still more wasteful because it withdraws the labor

thus expended from other fields to which it could have been more profitably devoted.

Timber and forest economics cannot be dissociated from the intricate and everchanging economic relations of all industry. But it would seem safe to assume that protection against fire and ravage made universal and uniform among all timber properties, so as to involve no unequal burden upon any competitor, will be adequate to guarantee, by natural replacement, the future of the timber supply at least till such time as the permanent forest needs of the United States, and the most economical way of supplying those needs, can be made more apparent.

A uniform national policy of forest protection and of public acquisition of cut-over lands appropriate for permanent forestation should be adequate and practicable. But the duty of the public should be not confused with the public obligation of private industry. The specific public obligation of the lumber industry is to do well its task of making and selling boards. Along with all others in the nation it shares in the obligation to provide adequate forests for future industry. But this is an obligation common to all and not exclusive upon the lumber industry or upon present owners of its raw material. Being so, the burden of provision for the future should be borne by the public which will profit therefrom, and not by a single industry; lest thereby it undermine the very industry whose future it seeks to safeguard. Economic forces which rule all productive activities will overwhelm a forest policy set up in defiance of them.

MANDATORY CONTROL OPPOSED

BY E. A. STERLING, FOREST ENGINEER

IT seems to me that a discussion of Col. Henry S. Graves' "Principles of Legislation" necessary for the enforcement of a national forest policy is premature and that the fundamentals of the situation should first be clearly established.

In taking this attitude I want to emphasize that the desirability of a sound, national forest policy is fully appreciated, and that whatever is said is in keeping with the request for frank comments and with a sincere desire to assist in developing the subject. The complexity of the problem is also realized, and it is largely for this reason that I believe the first step should be the establishment of basic principles, which are sufficiently sane and obvious to be generally accepted, rather than the creation of arbitrary provisions based on proposed legislative action, which it would be extremely difficult to attain unless it was accepted and approved by all concerned.

While this is in no sense an attempt to outline the fundamentals, I will attempt to summarize below a few of the points which seem pertinent.

1. It is frequently stated, without explanation or figures, that private forest lands must be put under long-time management if an adequate timber supply is to be assured. To carry conviction, and show how much and why this private land is needed, would it not be helpful to develop the following:

(a). The probable lumber consumption at the end of, say 30 and 40 years and thereafter, based on the curve of past consumption in relation to the normal increase in population, and the replacement of wood by substitutes.

(b). The sustained annual output from national forests, beginning, say 30 years hence, when the supply will be much more needed than now.

(c). The prospective future output from state forest lands and from the private lands being operated under definite long-time management.

(d). The forest-producing land needed in addition to the above, to give an adequate sustained output.

The object of working out the points under No. 1 and its subheadings would be to ascertain as definitely as possible the amount of forest-producing private land needed to supplement the ultimate supply from sources now assured. It is a major premise in any proposition to know what is to be accomplished. Having established this, the next step is to find means for its consummation, which it would seem could be worked out progressively as follows:

A. The acquirement by states, as far as they can be persuaded to do so by publicity and legislation, of the cut-over and otherwise unproductive lands, which can be acquired at a reasonable price and reforested with promise of success.

B. The much more limited possibilities in the encouragement of municipal forests by acquirement, reforestation and otherwise.

C. The encouragement of private, long-time forest practice by reasonable tax legislation and co-operative fire protection, wherever feasible. This development has been very slow in the past because of the economic factors which prevent the profitable use of capital in such enterprises, but it is reasonable to expect that market and general economic conditions in this regard will change materially in the next 30 years, and that long-lived corporations, and particularly wood-consuming organizations, will take steps to grow successive forest crops to exactly the extent that it can be made profitable.

D. A continuation and extension of the federal purchase of forest lands, both forested and cut-over, and their inclusion under an established technical and administrative policy.

It is my personal opinion that under the existing political and economic situation a policy aimed at the

mandatory acquirement of private lands will fail; (1) because the public has not been convinced that it is necessary; and (2) for the reason that sufficiently strong opposition would immediately develop to not only defeat such a policy, but to jeopardize any forest policy.

One hears a great deal about the enormous areas of cut-over land more suitable for forest growth than agriculture. If this is the case, is it not a logical step to ascertain the amount and condition of such land and redeem it before taking over the commercial timber, which is to supply the demand for lumber? If the private forest lands are to be reduced to a cut-over condition before the government, by mandatory action or otherwise, steps in and imposes methods and systems which will reproduce such forests, why should we not start with the lands which are in a cut-over condition today? To be sure, the expense of regeneration would be less if the timber was cut more carefully to start with, but if we have some 200,000,000 acres which are practically unproductive at present, is it not the truest kind of conservation to put this into productivity first? At the same time, every possible effort might be made in the way of tax and fire legislation to prevent existing forests from becoming waste when cut over, this probability being helped by increasing lumber and stumpage values.

A suggestion, which I certainly hope will not be misunderstood, concerns the co-operative basis necessary in

developing an acceptable and practical policy. Since private timberland owners are primarily interested in the policy which has been outlined in your "Principles of Legislation," would not the whole matter be better received, and get a fairer hearing if these private owners were consulted and their opinions and co-operation asked, both as timberland owners and as citizens, who have the best interests of the country at heart?

The gulf which has always existed between business interests and the government, it seems to me, could be narrowed in this case if the timber owners were made more fully cognizant of the situation as regards a national timber supply, and the federal and state officials in turn learn of the responsibilities pertaining to the use and returns on capital invested in timber. The government official can whole-heartedly consider the best good of the people as a whole because his check comes regularly from the United States Treasury out of funds supplied by these same people. The business man, on the other hand, may be equally interested in public welfare, but in order to live and to conserve the capital entrusted to his care, must assume responsibilities and follow policies which are often criticized because the critics have an entirely different point of view.

This expression of my personal views is in the spirit of helpfulness and in keeping with the request for a frank discussion.

PUBLICITY EDUCATION NECESSARY

BY R. S. MADDOX, STATE FORESTER OF TENNESSEE

I UNQUALIFIEDLY concur with Colonel Graves' opinion that there must be a strong national policy in order to control adequately the great issues confronting us today.

Colonel Graves has covered the main problems in a very clear and thorough manner. In connection with this big plan I would suggest that in Tennessee and the entire south, publicity education direct from the seat of the Federal Government, co-operating with the States, is necessary in this scheme. Tennessee is not different from many other States in permitting the neglect of her forested lands and timber problems through lack of knowledge. A sure sentiment is growing but it needs co-operation which culminates in action. This result, I believe, will be achieved most rapidly through a systematic co-operative campaign between Federal and State Governments.

Reclamation of waste lands in Tennessee is one of the

big issues in forestry. It is most vital to the State and in addition the results from reclamation projects are more or less rapid and wholly successful. These experiments being carried on in different sections with individual landowners help to make a substantial sentiment for forestry and thus help other forestry problems which we all recognize as of paramount importance. This phase of forestry should be included as a specialty wherever possible in any national policy.

Stimulation of forestry on lands under private ownership as stressed by Colonel Graves cannot be too much emphasized as applied to Tennessee. Here, with the exception of State and Federal owned lands comparatively small in acreage, the holdings are in the hands of individuals and companies. These privately owned lands thus embrace the great bulk of the natural resources and should secure, therefore, direct effective co-operative assistance from the Federal Government.

A LUMBERMAN'S VIEWPOINT

BY EVERITT G. GRIGGS

PRESIDENT, ST. PAUL & TACOMA LUMBER COMPANY

I BELIEVE that a national forest policy should be established by the co-operation of the Forestry Department and practical operators who are continually facing taxation problems and operating costs. So

much theory is advanced in matters of this kind that men who are engaged in the business become disgusted with the plans advanced. It certainly would seem that the history of the lumber business, as it has spread across

the continent, should develop a plan which would protect the future supply of our lumber. It is apparent that very little will be done in conserving a product that has no ultimate value, and the tendency in the past has been to criticise lumbermen and operators for organized efforts to control the product or secure a price for a commodity which is so essential.

Forestry is practiced in foreign countries, where the value of stumpage has reached a point that reproduction can be carried out. Where stumpage is so cheap that the private operator cannot see any investment value, and where the cupidity of the tax gatherer forces sacrificing the timber in order to meet the needs of the community, timber is going to be looked upon as a detriment to the land rather than a benefit.

The State of Washington eliminates speculative values in timber, but sells its lands from time to time to operators who must remove the timber within a definite period, say, one or two years. While this eliminates speculative value in purchasing for future rise, yet it forces on the market the entire tract after it is purchased.

In my judgment, the chief problem confronting the timber owner today is the matter of taxation, and if this

could be properly solved and a man who could afford to hold timber was enabled to retain it until the demand warrants its cutting, a good many of our problems would be disposed of. As it is now the timber pays a tax every year, and an increasing tax, until it is cut off. No more destructive method of timber holdings could be imagined than this system.

It would seem, in view of the fact that there is such a wide divergence of opinion as to the actual standing timber of the country, that the Government, through its Forestry Department, might employ the Aeroplane Service to take views from above of every representative stand of timber in the country, and in this way formulate a policy and an actual determination as to the value of the timber stands throughout the country. There are a good many things that require the backing of Uncle Sam to finance; and I believe the lumbermen generally, at least the progressive ones, will co-operate in every way with the agencies of the Government if the problems that confront them are approached from a practical viewpoint, and not altogether from theoretical or academic stands.

LEASE HOLDS INTERFERE

BY G. L. HUME

VICE-PRESIDENT MONTGOMERY LUMBER COMPANY, SUFFOLK, VIRGINIA

I DO not believe that under the present existing laws and conditions in this section that the proposition for such a National Forest Policy as outlined by U. S. Forester Graves would be practical, especially in the North Carolina pine belt. This is principally due to the

fact that the majority of the timber is held on lease holds, that is, the lumbermen own the timber but not the land. In fact, in only a very small per cent of the cases do the same parties own both the timber and the land in fee.

NO HALF-WAY POLICIES

BY J. E. BARTON, COMMISSIONER OF FORESTRY FOR KENTUCKY

I HAVE read with the keenest interest the address by Colonel H. S. Graves on "The National Lumber and Forest Policy," delivered before the American Lumber Congress at Chicago in April, 1919, and am heartily in support of the remedial measures advocated there. No half-way policies in connection with the establishment of a broad and adequate national and state forest policy will meet the situation. It is necessary to formulate a stiff program and adhere rigidly to it before any progress can be made in legislation which will adequately provide for the perpetuation of our forest resources as a part of the national life of the nation. As has been repeatedly stated, the recent war has certainly demonstrated the weakness and the incompleteness of the policies and programs already in operation. These merely scratch the surface and the broad problem of privately owned timber lands is not touched. There is no reason, with the amount of waste lands at the present time in the individual states and in the United States, that sufficient forest reserves cannot be provided adequately to assure a sufficient supply of timber for the country for an indefinite period, but this is going to be possible only through clear-cut, well

defined and vigorous legislation on the part of the states and the Federal Government, and adequate co-operation among all agencies concerned, in seeing that the details of such legislation are conscientiously carried out. So far as Kentucky itself is concerned, there is already plainly evident that the definite change from large permanently located saw mills, backed by large bodies of timber of sufficient size to warrant the expenditure for large plants to small minor operations, cutting isolated bodies of timber or returning to cut inferior varieties left during the initial operations. The interpretation of this situation means that the virgin stands of timber have disappeared or will be gone in the immediate future. Any program looking to the establishment of a policy which will assure the timber resources of the country indefinitely would involve these features:

(1) A complete and accurate inventory of the remaining timber resources of the individual states and of the nation.

(2) Extensive investigations in the matters of yield and growth, upon which, at the present time, there is, over large regions, little or not satisfactory data.

(3) A thorough study of the tax situation, which in large numbers of the states makes not only undesirable, but in most places impossible, the holding of the timber land by private individuals with the view to maintain such lands in forest crops. Forest taxation laws, so far as feasible, should be uniform throughout the states, and certainly throughout definite timber regions, so the same advantages may accrue to all individuals throughout the region, and certainly throughout the individual states.

(4) A very definite plan for the purchase of lands by the states to be retained as a nucleus for extensive state forests in the future, such purchases to be backed by adequate appropriations.

(5) Increase in appropriations on the part of the Federal Government for co-operation with the states under the Weeks Law, looking to adequate fire protection to the forests within the state boundaries.

(6) Increased purchases on the part of the government in the eastern part of the United States particularly of lands for national forests.

(7) Rigid legislation in regard to the cutting of timber, brush disposal, replanting areas suitable for timber crops and other measures necessary to the perpetuation of the forests of the nation.

(8) Regulation of the disposal of timber more in accordance with the law of supply and demand, and less in accordance with the exigencies of local conditions induced by taxation and other features.

The question of freight rates and transportation loom large in the present problem. And such matters as organization within the trade to avoid waste, effective marketing both at home and abroad and to avoid over-cutting of present available supplies demand nation-wide study and concerted effort of all interest involved.

A FOREST POLICY BADLY NEEDED

BY ELLWOOD WILSON, PRESIDENT CANADIAN SOCIETY OF FOREST ENGINEERS

A DISCUSSION of the proposals of U. S. Forester Henry S. Graves for a national forest policy is most appropriate.

The time has certainly arrived when the exploitation of forest lands must cease and they must be managed for sustained yield. The cutting over of timber lands, leaving them in an unproductive state, cannot be allowed to continue. The theory that a man can do what he likes with his own property, unless his use of it damages his neighbor or the public welfare must be applied to private owners of timber. The speculative purchase of virgin timber lands, the rush to cut and market the cut, denuding the lands and overstocking the markets, may have made a few timber "barons" but has in no sense been a benefit to the country at large. The time has now come when we must imitate the countries of Europe which have passed through the same crisis.

Whether Colonel Graves' program is just the right one or not is not certain, but the idea of regulation is absolutely right. The timber lands of the country must be kept productive and those lands which are suitable only for tree growth must be made productive. It is a

question whether the mere regulation of cutting will make such lands productive, probably in many cases artificial regeneration must be resorted to, but in any case the country at large must take the question up and find a solution for it. The most satisfactory plan would be for the holders of timber to realize the situation and by consultation with foresters initiate steps to perpetuate their timber, thus acting not only in their own interest but in that of the country at large.

It would seem that the whole matter was one of education and that an intensive propaganda should be commenced and carried on. One very good way of bringing home to lumbermen the necessity for better methods is through the banks which advance them money and who hold their bonds and other securities. Boards of trade are also interested, also rotary clubs. Newspapers of course should be reached, especially in localities where timber lands are situated. School children should be reached not only because they are future citizens, but because they often educate their parents. Other methods will readily suggest themselves to those with experience in such work.

TERMS USED IN FARM FORESTRY

THE increased interest in the subject of private forestry, particularly with reference to farm forestry, has brought about the general acceptance of the term "woodland" or "woods" instead of the original one of "woodlot."

A large proportion of the woodland in the eastern United States is in irregularly shaped tracts, spreading out over ridges, ravines, slopes, swamps and poor lands, whereas "woodlot" carries the idea of a small sized, regularly shaped, and, in a large section of the country, fenced tract. When applied to the large or irregularly shaped tracts, it is obvious that the word inadequately describes the conditions. "Woodlot" probably originated in New England and seems fairly well established there.

So long as only conditions like those in New England were considered, "woodlot" was accepted as adequate, but in the last few years farm forestry has been developing rapidly throughout the country. The private forestry movement is of tremendous importance not only to the owner of woodland, but to the whole community in which he lives or in which the timber occurs. It is extremely desirable that the success of the movement should not be hindered by the use in forestry literature of a term which does not fit the conditions.

"Woodland" and "woods" are more satisfactory, more expressive, and avoid the possibility of creating confusion in the minds of the people over most sections of the country where the word "woodlot" has never been in local use.

THE USES OF WOOD

FLOORS MADE OF WOOD

BY HU MAXWELL

Editor's Note:—This is the fourteenth story in a series of important and very valuable articles by Mr. Maxwell on wood and its uses. The series will thoroughly cover the various phases of the subject, from the beginnings in the forest through the processes of logging, lumbering, transportation and milling, considering in detail the whole field of the utilization and manufacture of wood.

IN some respects and for some kinds of floors wood has no equal. It is attractive in appearance, agreeable to the touch, contains low heat-conducting properties, is nearly impervious to water, and the degree of hardness or softness desired may be secured in a measure by careful selection of the wood. Wide choice of color is possible. The material is easy to cut and work, is fairly light, strong enough to meet most of the demands likely to be made upon it, sufficiently hard to offer necessary resistance, and its cheapness places it within the means of those who need floors.

The range of choice as to cost, figure, hardness, color, and durability is extensive. When all of these factors are considered, wood is found to head the list of floor materials in this country. If it does not occupy that position in

some other countries, it is due to scarcity there. Wherever wood can be had at a reasonable cost, and in adequate quantity, and of suitable kinds, it holds first place as stock of which floors are made. The principal argument against it is its tendency to burn readily. Its use is somewhat limited by fire laws in towns and cities.

It has been many times demonstrated that properly laid wooden block floors resist fire in a remarkable manner. In the Baltimore fire, pavement of such blocks, exactly similar to those laid in floors, passed with little injury through the conflagration. It has been noted, likewise, that the overturning of cauldrons of molten metal in foundries, where floors of such blocks are in use, do less injury to the floors than would be expected. The blocks, under such circum-



DOUGLAS FIR FOR FLOORING

The most important flooring material in the region west of the Rocky Mountains is Douglas fir. It does not measure with some of the eastern flooring woods in hardness, but it is moderately hard and it is so abundant that it has no rival in the western part of the United States, and it also finds its way to eastern states.

stances, burn with such extreme slowness that the floor is not usually put out of use.

Wooden floors formed parts of some very ancient buildings. Occasionally the floors and roofs were of wood while other material formed the walls. Traces of wooden floors are found in some of the prehistoric stone buildings which are supposed to have been erected by ancestors of Indian tribes of New Mexico and Arizona. Such floors may have been only poles and small logs closely fitted together, or two or more layers crossing at right angles; but the floor was an essential part of the architect's plan and of the builder's work.

The evolution of the wooden floor has been interesting and its history long. The neolithic man may have floored his camp with brush cut with a stone knife and spread over the snow or the wet sand to keep his feet out of the water or off of the ice. No records of such have come down from the stone age, but they doubtless existed. Be that as it may, miners in Alaska make brush floors yet to hold their feet above the snow, water, and slush when they pitch their tents for the night's camp during their cross-country expeditions. After packing a heavy load on his shoulders all day, or driving a team of huskies, the traveler in the far northern country selects his night's camping place, and one of the first things he does to make his camp ready is to cut spruce brush, spread the branches for a floor, start a fire in his sheetiron stove, and then remove his boots to give his tired feet a rest. The branches keep his feet dry though



PACIFIC COAST MAPLE

Most maple flooring is cut east of the Mississippi river and north of the Ohio. It comes from the common sugar tree, generally known as hard maple. Some maple flooring is cut on the Pacific Coast from the Oregon maple. It is not abundant but the flooring is generally satisfactory. It is not quite so hard as the eastern maple.

snow or water may cover the ground beneath. Thus, what was probably the oldest pattern of wooden floor in the world is still in use, having undergone no change since the days of pleistocene men who hunted the saber toothed tiger in California and the hairy elephant in Siberia.

The American pioneers floored their cabins with wood before they had sawmills for cutting lumber. Most of the earliest huts in the forest had puncheon floors, if they had any except the ground, for dirt floors were not

then uncommon and they were used when wood was abundant. The surface of the ground was smoothed, tramped hard, and it was frequently the only floor the cabin knew. Rural politicians of early days sometimes liked to parade the information that they were "raised in a cabin with a dirt floor." They seemed to imagine that it was a credit to them, while, as a matter of fact, it was an admission and confession of ordinary laziness, because no man had any excuse for living very long in a cabin with a dirt floor in those times and places of abundant timber.

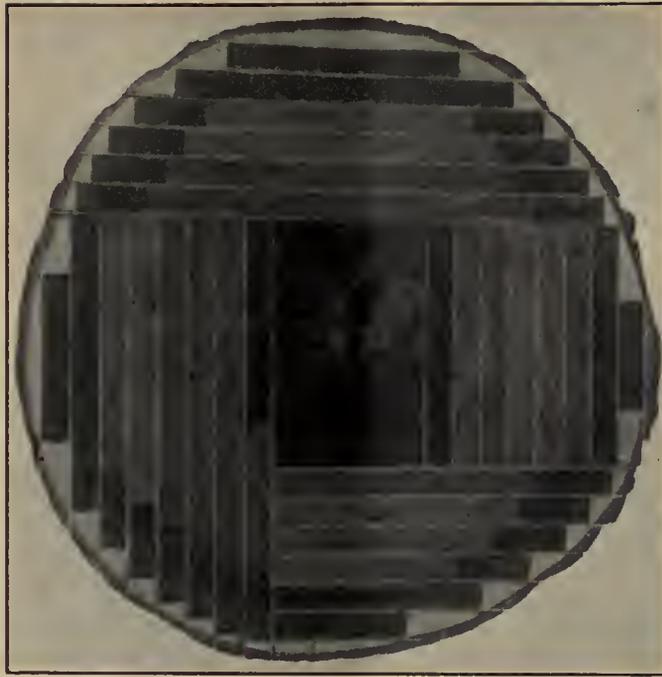


RED OAK FLOORING MATERIAL

Manufacturers of flooring find much excellent material for their output in the mature trunks of northern red oaks. This wood is not usually as highly figured as the white oak, but it is naturally higher in color and that may offset any deficiency in the figures of the quartered wood. It is frequently well figured.

Puncheon floors were common. They were made of split logs, flat sides up, and smoothed with ax or adz, and fitted edge to edge. In the California redwood country, houses somewhat pretentious in dimensions were often floored with split

puncheons, not only the first stories, but the second as well. Redwood splits so perfectly that puncheons a foot or more wide and two or three inches thick can be rived in shape nearly as perfect as sawed lumber. In eastern hardwood regions, during the years when split floors were being made, the finest flooring puncheons were of ash, because of the facility with which that wood splits. Chestnut and oak were also favorite puncheon timber. Split boards suitable for floors were often made into doors for the cabins, when sawed stock was not convenient. Those who wanted something a little better than split puncheons for floors, and could not procure lumber from a saw-



METHODS OF SAWING FLOORING

Flat grain, edge grain and quarter-sawed stuff all come from the same log. The name given the stock depends upon the manner in which the boards are cut. Any wood may be quarter-sawed, but better results are obtained from oak than from most others, because the quartered grain in oak is more easily seen.

mill, had recourse to the output of the whipsaw operated by hand power. Floors and doors were the first places in cabin building to be filled by sawed lumber. When it became more plentiful, the entire cabin was built of it, but that was not the case at first.

It remains true, however, that floors conforming to civilized standards were not common till sawed lumber became available. The older and ruder wooden floors were really makeshifts. Nevertheless, even when after sawed lumber was to be had, some preferred to adhere to the old puncheon size in providing flooring lumber, that is, they wanted planks as large as could be had, and sometimes they were much thicker than necessary. Floors strong enough for factories were put in residences. At the present time, flooring lumber is preferred in strips from two to four inches

wide and an inch or less in thickness; but there was a time when the house builder imagined that the wider the flooring lumber, the better. Modern practice prefers the narrow strips. They give less trouble on account of shrinking and swelling. The openings where the strips are joined edge to edge take up the swelling of the wood in damp weather; and the shrinkage in dry weather is distributed among the many cracks and is not much noticed. But the wide flooring boards of many years ago might shrink or swell half an inch per plank, causing unsightly cracks to open and close with the changes of the seasons, or the alternating wet and dry spells of weather. Such behavior did not seem to be regarded as a very serious matter then. An old house in Pike County, Pennsylvania, was torn down after the pitch pine floors had served 160 years and were still serviceable, and the size of the flooring planks amazed the modern mill-men who saw them. The planks were two feet wide and an inch and a quarter thick. Such a floor would be out of fashion now, though when the old Pike County house was built, the wide pine flooring planks doubtless excited the admiration of all who saw them.

The length of service to their credit is proof of the excellent wearing qualities of the northern pitch pine, a wood which deserves a better reputation than has been accorded it.

Most modern floors are made of woods moderately hard. No such custom was strictly adhered to in former times. In the white



FLOORING ON SEA AS WELL AS ON LAND

A large bill of lumber is required annually to floor the better class of boats, for all flooring is not destined to remain on land. Some of the handsomest floors to be seen anywhere are put in vessels, and wood gives as good service there as in any other situation.

pine country many floors were made of that extremely soft material. It was a favorite wherever it was known. It was convenient, cheap, and it worked easily. A similar custom prevailed in far western regions in regard to redwood and sugar pine. Convenience, in

ing. The chief purpose of all is to provide a floor that is practically waterproof, dust proof, airtight, and which will remain solid and presentable under heavy wear and for a long time.

Some floors are laid double, the lower being known as the sub-floor, while the upper layer forms the visible finish. The sub-floor is not seen under ordinary circumstances, and the lumber in its construction need not be selected with a view to its appearance. It is not subject to direct wear and for that reason the wood is not required to be hard, though it must be strong enough to safely carry all the load placed on it. Such is really a two-ply floor, and the boards of the two plies generally cross each other at right angles, or obliquely. The top layer is for show as well as for service, and in most instances a fine hardwood is selected, one that looks well and wears long. This floor

may consist of narrow strips matched side by side and end to end, and perhaps of less than half an inch in thickness. It is not necessary to use thick lumber for this top floor because it is supported by the sub-floor, which carries the load. The principal advantage in using thin lumber for the upper floor is that it effects a saving of valuable wood. The thin shell is sufficient.



ROUGH FLOORING STOCK

Seasoning is one of the first and most important processes through which flooring is passed in its preparation for the planing mill. It may be dried in kilns in a few days, or it may receive its seasoning in the air. That process takes longer but the seasoning by air is always popular.

many instances, counted for more than the length of service that might be expected when the wood was laid in floors. Even a floor of white pine would last several years, and builders seldom looked farther ahead than that.

Clear white pine is quite soft and as floors it wears rapidly if subjected to much use; but the knots are hard and wear slowly. Consequently, white pine floors become very uneven after a few years. Every knot becomes a high place and the clear wood between wears away, leaving valleys between the knots. Hardwood floors wear more regularly. With them less difference in hardness exists between the knots and the clear wood.

The usual kind of modern floor is known as tongued and grooved, or it may be known as matched. Such has been in use hundreds of years, but there are different sorts of tongues and grooves. Generally the tongue is cut in one edge of the flooring piece, the groove in the other, and these pieces fit edge to edge. Sometimes both edges are grooved and a flat dowel, made as a separate piece, fits in both and serves as a tongue for both. The Egyptians seem to have been acquainted with that method of joinery, so it dates back a long time. Carpenters and planing mill operators have exercised their ingenuity in devising and laying new kinds of floor-



BLOCK FLOOR IN LARGE FACTORY

The floor shown in the above illustration is made of redwood blocks of 4x6 inches surface and a depth of two and a half inches. It is doing service in a shipbuilding plant on the Pacific Coast. Such blocks have become popular in certain kinds of plants where wear is heavy and the elements of decay are active.

Manufacturers and users of flooring lumber make much use of the term "grain." That word is common with most people who deal with dressed and finished lumber. The term is not understood in the same way by all people who employ it, but the flooring people give

it a precise and definite meaning. Flat grain and edge grain are the most common terms. The former is applied to lumber sawed tangentially, that is, off the side of the log in the same way that the slab is taken off. Edge grain flooring is cut radially; that means, the saw is set to cut from the sap to the heart. The same method is known as "quarter-sawing." When the sawing is done from the sap to the heart, the edges of the annual growth rings are exposed to view in the flat surface of the flooring strips, hence the name, edge grain. In this instance, "grain" is synonymous with annual ring. When an edge grain floor has been laid and is ready for use, the exposed surface, that which takes the wear, shows the edges and not the flat sides of the

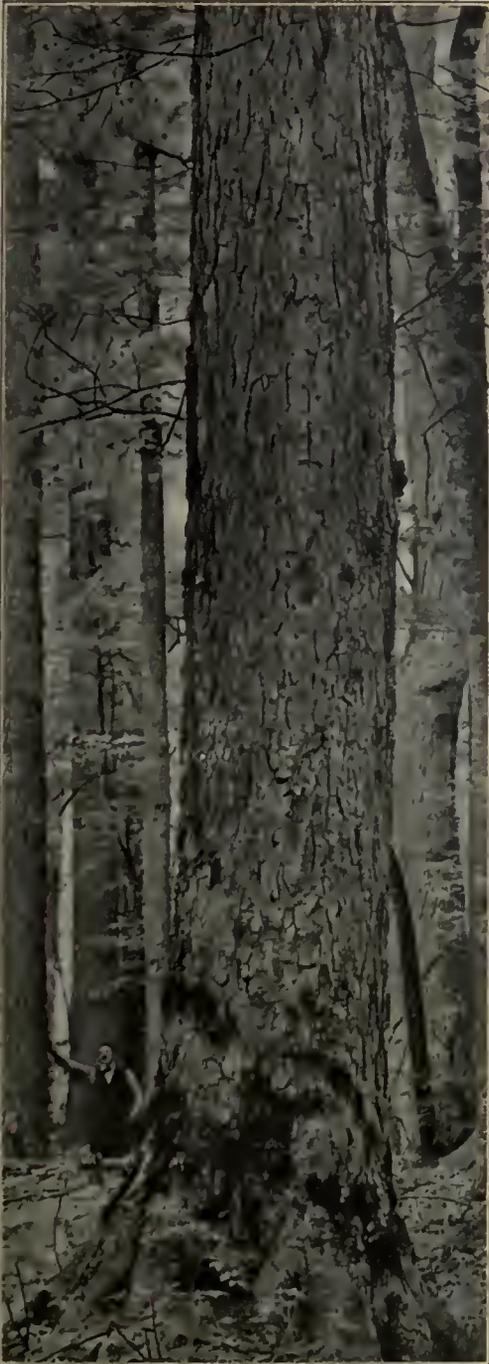
growth rings. These rings may be visible in the floor as one walks across it. At any rate, they may usually be seen if a careful examination is made. Such is not the case if the floor is laid of flat grain lumber. It presents a different appearance.

One kind may be preferred in one situation, another in another. It is partly a matter of taste, partly a matter of utility. Edge grain flooring is stronger, harder, and wears better, according to claims of some; but this claim is at times open to question. The kind of wood and the rate of growth have something to do with the appearance of the floor. The question as to which is the best is still unsettled, but if one kind were unquestionably better than the other, the public would long ago have found it out, and the best kind would be in use to the exclusion of the other.

Floors of parquetry are built of blocks, strips, and borders. They should

not be confused with the block floors which are popular in factories. Those of parquetry are in the best class and may be quite expensive. It would not be wholly inappropriate to call them "wooden tile" floors, because in pattern they resemble tile. Woods of different and contrasting colors are selected, because beauty is the object sought in such a floor, and it is produced by contrasts and harmony. Nothing would be gained if all component parts of such a floor were alike in color.

The woods may have colors imparted to them by artificial means, by employing stains and dyes. As white a wood as holly may become a substitute for as black a wood as ebony; birch may take the place of red mahogany; and yellow poplar may answer for woods of deep



(Courtesy Maple Flooring Manufacturers Ass'n)
THE GROWTH OF CENTURIES

A long, large trunk, clear of branches, is a guarantee of age and maturity in maple, and it is from such trunks that the highest class of flooring stock is procured. Trees which will cut a thousand feet of good maple flooring are above the average, though an occasional tree overruns that figure.



(Courtesy Maple Flooring Manufacturers Ass'n)

A BEAUTIFUL BEECH

In the forest this tree often attains a height of 120 to 140 feet, with smoothly rounded bole as symmetrical as the pillar of a cathedral. The bark is light gray. The wood is close-grained, hard and strong and excellent for use as flooring.

colors; but it is better to use woods which naturally have the desired colors, because stains and dyes may not penetrate much beneath the surface and after a little wearing down by use, the real tones of the woods may appear and betray the counterfeit.

Floors of parquetry may be built in place, block by block, strip by strip, and border by border; or they may be made in factories, the pieces all matched ready for laying in sections. One style of such flooring is called wood carpet, though it is more properly a floor-covering than the floor itself, and that is what is implied when the name carpet is used.

Some floors are not meant to resist much wear. Quite soft woods answer for such. Floors of that sort are oftenest seen in large store windows intended for show, and in alcoves and on balconies where merchandise is displayed and few persons ever walk, except window trimmers, decorators and janitors. Very soft woods like white pine and basswood will stand all the wear to which they are commonly liable in such situations.

Factory and warehouse floors are of a wholly different kind. They must stand rough usage, and the wear is often excessive. Heavy trucks and barrows trundle over them, and the surface of the boards, if the floors are of lumber, are apt to be splintered by the grinding and crushing action of wheels, or splintered or dented by the fall of heavy bodies. This holds true of warehouses in particular, the

floors of which must be strong. To secure this condition, sometimes the sub-floor is made of planks several inches thick, and over this is laid a thinner floor of hardwood to receive the immediate wear. By that arrangement, the surface is kept fairly smooth. In many instances, the flooring in a factory or a warehouse is of edge grain lumber, such being less liable than plain planks to split and splinter under rough usage.

Another kind of flooring common in factories, mills, breweries, tanneries, and stables, is made of blocks, set in a way to expose the end grain to wear. These blocks are similar to those used in paving streets. It is customary to set such blocks on a plank floor as a foundation, and after the blocks are in place, they are treated with a dressing of tar, pitch, sand, asphalt, or some similar material. This fills the interspaces between the blocks and makes the floor solid and tight.

The end-grain of the blocks forms the surface of the floor. It wears better than the side of the block, because the ends of the wood fibers bruise slightly, forming a compact, felt-like mass, resembling a cushion, and this resists wear in a remarkable manner, and at the same time it is sufficiently soft to deaden and neutralize the jolts and jars caused by passing trucks or by the dropping of heavy objects. It is a yielding and semi-noiseless floor, and for that reason it is popular for certain kinds of buildings. The employment of wooden blocks as flooring



SOUTHERN TIMBER FOR FLOORING

Flooring is made in the South as well as in the North, and each kind has a field to fill. The above picture represents a forest scene in Georgia where trees of different kinds grow intermingled, and among them are some possessing great value as flooring stuff. Softwoods and hardwoods grow side by side.

material is rapidly extending. Many factory floors are constantly damp, which condition is due to the nature of the business carried on. Under such circumstances, decay is liable to attack wood.

The usual combination of warmth and dampness conduces to speedy decay, unless measures are taken to counteract it. Such measures are well understood and are within easy reach. They consist of preservative treatment with certain chemicals, creosote among others, which retard the development of decay and prolong the floor's period of usefulness. This treatment is possible with all wooden floors, but is oftenest met with in those made of blocks set on end. The preservative treatment is applied to the wood before it is laid in the floor. Wood kept always dry has no occasion to be given treatment to hinder decay, since dry wood does not rot. Some woods in their natural state resist decay much better than others, when they are employed as flooring blocks, and with some of them the application of preservatives may be dispensed with. Usually woods of deep color in their natural state are less subject to decay than are those of light color, but this is not a universal rule. Among woods which in their natural state resist decay well are walnut, locust, redwood, osage orange, cypress, heart yellow pine, catalpa, mulberry, mesquite, and red cedar. These are suitable for flooring blocks for warehouses and factories where the causes of decay are active. Other woods may last a long time if given the proper preservative treatment.

All kinds of commercial woods are occasionally employed as flooring. None is so soft that it cannot fill certain places; none so hard that it is universally rejected. Those as white as balm of gilead and holly fill certain places in this industry, as also do those as dark as ebony and dialamban. Those light of weight, like arborvitæ and white pine, are acceptable as floor material, and no less so are the heavy woods like lignum-vitæ and salmon gum.

It is not possible to quote precise statistics to show the kinds of wood made into flooring and the annual output of each. Statistics have not been kept in a way to show this. Figures relating to flooring production, compiled by the government, include certain other products, and the totals only are given, the separate items not being presented. Tables which contain figures on flooring, contain also such items as siding, ceiling, doors, sash, blinds, and frames for windows and doors, all thoroughly mixed in the totals, and it is now impracticable to separate them.

It is safe to conclude that the leading floor woods are yellow pine, Douglas fir, oak, hard maple, and hemlock. Probably half of all the flooring cut in America is made from the five here named. But the list of flooring woods

does not end there. Birch, yellow poplar, beech, chestnut, cypress, gum, and many more meet a large demand. Each possesses qualities which give it value.

Maple is very hard, takes a smooth finish, has no figure except the birdseye of an occasional tree. It is among the whitest of our woods. Its strength rates very high, and its stiffness is excelled by few woods of this country. Eight species of maple occur in the United States, and probably every one is made into flooring except the vine maple, which is too small; but only one of the maples is prominent as flooring material. It is the hard maple of commerce. The silver maple (often called soft maple) is probably second among the maples as wood for floors.

Most of the fifty-odd oaks in the United States might be made into flooring and many of them are so utilized; but most oak flooring is of white oak, of which there are several important species. Oak falls below maple in hardness, stiffness, and strength; but it ranks high in these three qualities, and in addition, it is always more or less figured, and many persons use it because of the figure, particularly when quarter sawed. The red oaks are good stuff, but their color is not quite so satisfactory as that of white oaks.

Birch flooring is in a class with sugar maple in hardness, stiffness, and strength, and two species, yellow and sweet birch, supply most that goes to market. Beech floors have never been quite so popular as maple and birch, but beech is an excellent wood, very hard, stiff, and strong, and its tendency to wear smooth makes it popular for dancing floors. In damp situations it stands more wear than other woods, and this makes it desirable for factory floors.

The leading pine flooring is manufactured from southern long-leaf pine, which is hard, strong, and it is often figured by growth rings. Douglas fir, from the region west of the Rocky Mountains, is now much used for flooring, and it measures about with long-leaf pine.

Red, black, and cotton gums are employed in warehouses and factory floors where heavy planks are used. These woods are tough and last well under truck wheels and in other situations where rough usage is met.

Block floors are of pine, fir, and redwood principally, but many other woods contribute.

Perhaps six billion feet of wood are yearly worked into floors of various kinds in this country. This total is based on estimates and does not represent exact figures; nor does the total include the sills, joists, and other supporting and supplementary timbers which sustain the floors. The relative amounts of hardwoods and softwoods are difficult to estimate; but probably softwoods are more than half, the leading softwoods being yellow pine, fir, and hemlock, and the principal hardwoods oak, maple, beech, and birch.

EROSION IN THE APPALACHIAN AND PIEDMONT REGIONS

BY R. O. E. DAVIS

THROUGHOUT the South Atlantic States the excessive erosion of the soil is probably more marked than in any other section of the country. The results of this excessive erosion are worst in the Piedmont section of the coast states. There are many factors influencing the rate of erosion, but the character of the soil causes a marked difference in the rates of erosion under the same conditions.

The heavy clay soil of the region erode fairly rapidly developing the shoestring type of gully with rounded edges. Where soils somewhat lighter with a higher percentage of sand particles in them are encountered, the type of erosion is that of the gully with vertical sides, or the caving gully type. Differences in the soil and subsoil influence profoundly the character of erosion. Silty soils or clayey soils with subsoils of a sandy character exhibit the most rapid and most difficult controlled erosions.

The regions of the South subject to excessive erosion are in a number of soil provinces, but the greatest amount of eroded soil occurs within the Appalachian and Piedmont regions. It is in the Piedmont Plateau, near the "Fall line," that the greatest difficulty is experienced in dealing with erosion. The Fall line forms the boundary between the Appalachian and Piedmont provinces and it is here that the rapids occur in the various streams in their course from the mountains to sea.

The soils of the entire section are mainly residual, *i. e.*, derived from the underlying rock and in general the topography of the region conforms to the structural character of the underlying layers. While erosion has affected the relation between the surface form and rock configuration locally, especially in the southern portion of

the region, the main ridges correspond with the position and the prevailing northeast and southwest direction of the more resistant rocks.

In localities where the surface is smooth the soils lie directly over the rock from which they are derived, but on slopes a considerable movement to lower levels has taken place mainly through the action of water. Outcrop of rock is frequent, but by far the larger part of the area is covered with a soil mantle of sufficient depth for the support of forests. Much of it is so steep that it is not

suitable for cultivation, and is best adapted to forests, grazing or small fruit production. The principal soils are the loams, clay loams, silt loams, sandy loams, clays, fine sandy loams and stony loams.

In the southern Appalachian region the forests on the hill and mountain sides have maintained an open and porous soil; kept in this condition by the covering of leaves and debris of



CLEAR AND STRIKING EVIDENCE OF WHAT EROSION WILL DO

A gully in the lowlands has gradually eaten its way back into the hill of this Georgia pine forest. Each rain adds to the length and breadth of the gulch.

the forest. The rains falling on the forest floor never reach the soil with unbroken force, so that the finer soil particles are not pounded and stirred and carried off in the water which flows over the surface. The velocity of the moving water is so reduced that where the forest covering is intact erosion is almost a negligible quantity. Where this rate of erosion is slow there has been established gradually a state of equilibrium between the slopes and rainfall. This slope remains practically constant for very long periods if the conditions are not changed. There is a slow movement of material, but this is not sufficient to disturb the general contour or to injure the vegetal covering. Only occasional cloud-bursts or exceedingly heavy rains produce a visible effect on the soil surface conditions.

It is true throughout the Appalachian region that the streams which flow from the wooded mountains carry very little sediment. Even the cases in which such streams appear turbid, much of the suspended matter is of organic origin. It is also characteristic of such streams that they rise more slowly after a storm, remain in flood for a longer period of time, and fall more slowly than similar streams in non-wooded areas. The Geological Survey has pointed out the characteristics of such streams in the Appalachian region of North Carolina and Tennessee. Cane River from Mount Mitchel and streams in the Lake Toxaway section never become muddy, although often greatly swollen from continued rains. These streams are in equilibrium with the land through which they flow. This equilibrium will be disturbed only by clearing the land, which causes a change in the relation of surface slope to stream gradient.

It is not uncommon to find the contrast to this condition in localities where the forest has been depleted either partly or completely by lumbermen. Often in the snagging of logs the trenches formed furnish drains down which the accumulated water rushes with great velocity. It is the work of a very short time to cut these trenches into gullies which often devastate



THE SACRIFICE OF THE TREES

A small wash too long neglected in a soil especially susceptible to erosion has resulted in a gulch which even the fine forest of Georgia pine cannot stop. With every storm some mighty tree becomes a sacrifice to the appetite of this voracious monster.

great areas. Frequently in the Piedmont region the erosion begins near the lowlands and, in certain types of soil, gullies are developed that extend for great distances even into the forests.

In some sections of the Appalachian region where the forest has been removed from the mountains or steeper hillsides, denudation has taken place until good sized areas of the underlying, bare rock are exposed. Much of the mountainous land is too steep for cultivation. The removal of the forest is due mainly to lumbering operations. It is this type of activity that is most destructive. The trees are cut without much regard to size or position and as soon as the lumber has been obtained the lumbermen move on to fresh fields, with ruthless disregard to the later effects on the land recently divested of its forest covering.

In the Piedmont section the more devastating effects from erosion occur because this land is not too steep for

cultivation and there has been extensive clearing of the land. The soils are of the same origin and very similar to the soils of the Appalachian region proper, so that from the results apparent in one region can be determined largely what will be the outcome of extensive clearing in the other.

The type of soil has a great influence on the rapidity with which bad effects from erosion become



THE GULCH APPROACHES—THREATENING DESTRUCTION

The removal of the forest covering has resulted in the formation of a gulch which has already forced its way across the road and is threatening to swallow up this farmhouse.

evident. It is possible on some types of soil, most notably the heavier clays, to cultivate on rather steep hillsides without serious damage from erosion. But even here continual vigilance is necessary to avoid the ultimate ruin of the land. On soils of a lighter character, or loamy condition, erosion is very destructive if once the land becomes gullied. On the other hand, soil of an open, porous nature is easily dealt with if the proper precautions are maintained to stop any indication of surface washing.

The fact that stream flow is greatly influenced by the presence of forests is so well known that it is almost trite to refer to it. However, when we consider the enormous damages each year from floods, as well as the cost of continual dredging of streams to maintain open channels for navigation, it becomes imperative that the forests' influence be emphasized. As already pointed out, many of the Appalachian streams rising in the mountain

show that floods are increasing in frequency and height. The evidence collected in this region shows that the Kiskimmitas and Youghiogheny rivers are the most important rivers in producing floods at Pittsburgh. The two streams drain extensively deforested areas of about the same size, with heavy precipitation and a high rate of run-off. In consequence of this deforestation both rivers collect and move their floodwaters to Pittsburgh in about the same time. This is but one of the worst instances where removal of the forest covering results in disaster to the low lying country.

Much of the erosion in forest is started by careless handling of logs. Under conditions where excessive erosion would not take place if care were exercised in handling cut timbers, the "snaking" and dragging of logs result in the formation of smooth depressions into which water gathers and drains from the steep hills. The



THE DEVASTATING RESULT OF EROSION

A one-time fertile valley in Tennessee ruined by a covering of sand brought down from the nearby hills, deprived of thin forests and subjected to erosion.

forests are clear and free from sediment; but many, and they are fed invariably from watersheds, in part, at least, cleared of their forests, carry a heavy burden of sediment.

The Flood Commission of Pittsburgh appointed to investigate the cause of floods at Pittsburgh and to recommend means of removing the danger, reported that extensive deforestation of the drainage areas of the Allegheny and Monongahela Rivers by giving a higher rate of run-off, has been the cause, in part, of the increase in frequency and height of floods along these and the Ohio rivers. It is furthermore well known that the carrying capacity of the river channels at Pittsburgh has been considerably reduced in the last fifty years. The records

rapid cutting of these depressions quickly results in the formation of gullies which advance into sections otherwise not susceptible to erosion.

The peculiar climatic and soil conditions of the Southern Appalachian region, especially, are conducive to the development of gullies. In some localities erosion started in the manner described continues to work its way back into the hills, constantly increasing in depth and width the eroded section with numerous gullies starting from the sides, until immense areas are devastated and the gullies formed almost defy the ingenuity of man to check their progress.

The removal of vegetable covering from the hills has resulted in a largely increased burden of solid material

in the rivers. This sediment is carried to the lower lying regions and much of it is deposited in the stream beds. The river channels become so filled that navigation is greatly hindered, or constant dredging must be resorted to. In addition, where storage reservoirs have been built by constructing dams, the sediment is deposited in the reservoirs and reduces their capacities. In fact, in some places it has been found inadvisable to try to maintain storage reservoirs, and the practice has been adopted simply of keeping open a channel. This results, of course, in the loss of much power. One of the power experts employed in developing the power from some of the streams in the South, testified before the Agricultural Committee of the House of Representatives a few years ago that the capacity of certain reservoirs was so much reduced that in a few years only the flow of the rivers

being farmed began to erode. But with increased value of lands the necessity of utilizing that already cleared becomes constantly more and more impelling.

Reclamation is of two classes; lands reclaimed for cultivation and those for forests. The same methods that are used in prevention must be used in reclamation. Where lands are reclaimed for purposes of cultivation, methods are adopted to increase the porosity of the soil, thereby assuring the ready absorption of water, and to retard the velocity of water not absorbed and flowing over the surface of the soil. The incorporation of organic matters in the soil, the growth of deep rooted crops, green manuring, sodding to pasture, deep plowing, the use of various forms of terraces and hillside ditches are some of the more common methods employed to prevent erosion and to reclaim eroded soils.



LAND RUINED FOR AGRICULTURE BY GULLYING

A deforested area near the Tennessee-Mississippi line which has resulted in the formation of numerous gullies and has ruined the land for agricultural purposes.

would be available for power. A report from the Geological Survey on the amount of silt carried by some of these rivers, states that the Susquehanna carries to the sea, annually, 240,000 tons, the Roanoke, 3,000,000 tons, the Alabama, 3,039,000 tons, the Savannah, 1,000,000 and the Tennessee, 11,000,00 tons. It is but reasonable to assume that at least half of this wastage of soil material is preventable.

In discussing reclamation it is well to remark that it is infinitely better to practice prevention than to apply reclamation. However, there is no denying the fact that the damage has been wrought in many places, and methods of reclaiming the devastated areas must be considered. In the past, with cheap land, it has been easier and less expensive to move to new lands, when those

The forests have been removed from some soils that should never have been deprived of their natural growth. In such sections the devastation has been almost unbelievable and the only feasible method of utilizing in any way these lands is by reforesting. The type and kind of trees best suited for the work must be determined for the individual localities.

From inquiry and personal inspection of the worst eroded sections of the Appalachian region, it has been found that practically all of the lands now useless can be utilized by reforesting. The benefits of such a course can hardly be exaggerated. The losses entailed in manufactures, power development, navigation, and flood conditions now amounting to millions yearly, will be greatly reduced if not largely eliminated.

WHY AND HOW SOME FOREST FIRES OCCUR

THE tremendous forest fires which swept the forests of the northwest during July and August, costing millions of dollars to fight and causing damages amounting to many millions of dollars more were due to what?

This interesting question is well answered in a letter dated August 2, to AMERICAN FORESTRY, by R. H. Rutledge, acting district forester of District No. 1, which includes the national forest area of northern Idaho and Montana. The fires were due to a dry year, the third in succession. Lightning, railroads, campers and brush burning started most of the 909 discovered on this forest area in July. Almost one-fourth were due to unknown causes, and twenty-seven were incendiary.

A terrific thunderstorm on July 31 resulted in fifty fires being started by lightning.

"This is the third dry year in succession for District

1," says Forester Rutledge. "The snowfall last winter was far below normal and in many localities spring precipitation was insufficient, many places having been without rain for over three months. High winds have prevailed quite generally for some sixty days and the atmosphere has been charged with electricity to such an extent that dry electrical storms have been constantly occurring. As a result the forest floor is as dry as a powder-house and because of excessive transpiration the leaves of coniferous trees have become so combustible as to be almost explosive when subject to ignition.

"While human agencies have been responsible for some of the fires this season, lightning has been by far the most prolific source of trouble. Dry electrical storms have started a great many fires in the most inaccessible parts of the forests where it has been impossible to get men and equipment on the ground quickly. In numerous



TWO UNUSUAL FIRE PICTURES SHOWING TREE STRUCK BY LIGHTNING AND ITS SPEEDY DESTRUCTION.

Live yellow pine tree, 125 feet high in the Selway National forest, struck by lightning about 2.30 in the afternoon. Bolt struck at point indicated, followed down tree to a large limb on right hand side of tree at upper edge of flame showing in picture. At that point it entered body of tree, followed down inside, splitting it through and through but did not break it off. 15 or 16 feet below bolt emerged, and continued down on outside of tree to ground in 3 distinct paths. Smoke was seen coming out of the split portion of tree shortly after bolt struck.

The second picture shows the split portion of the tree more thoroughly burned, and at one point will be observed a hole burned through the tree. The tree fell, completely destroyed by fire, twenty-four hours after it was struck. There now remains only a blackened fire scarred trunk 20 feet high. Picture presented by Supervisor Fenn, of the Selway National Forest, Montana.

cases it has required from three to six days for fire fighters to reach a fire from the nearest railway point. And when it is remembered that equipment and supplies for the men must be transported on pack horses over rough mountain trails and kept on the line at all times, the difficulties of the situation will be appreciated. Under these conditions it can be understood readily how lightning-set fires in these remote places become raging conflagrations before the fight against them can be begun.

"In spite of the difficulties handicapping the fire organization, District 1 has made a remarkable record for efficiency, even though a very large acreage in the aggregate has been burned over and many bad fires are still burning.

"Commonly fires due to preventable causes are near lines of transportation and communication and can be discovered and suppressed before they assume serious proportions, but the reverse is true where lightning fires occur. Not infrequently in the most inaccessible mountainous regions ten, fifteen, or twenty fires are started within a few minutes by a single electrical disturbance. Sometimes these blazes are scattered over quite a large extent of territory, often they are close together and before it is possible to start the fight against them they coalesce and form one big fire which, if the wind is blowing freshly, soon reaches the tops of the trees and develops into a crown fire that defies human efforts to combat it so long as the wind continues."

The area of fires was as follows: One-quarter acre or less, 427; one-quarter to 10 acres, 295; over 10 acres, 187, a total of 909, while the total acreage burned was 201,014 acres.

The causes of fires were as follows: Railroads, 179; campers, 131; brush burning, 96; lumbering, 9; lightning, 240; incendiary, 27; miscellaneous, 8; unknown, 219.

"The great majority of these fires have been put out or are now definitely under control and no longer dangerous although still being watched. At the close of July 30, there were not more than 25 fires running uncontrolled, mostly in the mountains of Idaho. On that date approximately 3,500 fire fighters were on the line, this, of course, not including the force of rangers, guards, lookout men, smoke chasers, and other regularly employed forest officers, numbering about 1,500 men.

"Detailed reports on file from the several national forests of the district cover the situation only up to the close of July 30. During the night of July 31, over fifty fires were started by one severe electrical storm that ran along the westerly slopes of the Bitter Root Mountains in Idaho forests. These fires have been merely reported by wire, their extent or precise locations not yet having been determined by the field officers. They were scattered over a territory embracing roughly 4,000 square miles. Does this single night's experience convey an idea of what the Forest Service fire organization in District 1 is contending with?"

F. C. Wilfong and his crew met with a most trying experience during the Selway fire on Crooked Creek on July 24. They were trapped at a point where three fires met, and their camp with provisions, clothes, etc.,

was burned. The party saved themselves only by lying in the Selway River for 35 minutes with wet blankets over their heads. Their train of thirteen pack horses was caught in the track of the fire, but they had been taken to a bunch grass hill, and only one horse was lost. The pack saddles were burned from the backs of the other horses.

Mr. Wilfong says of his experience: "There was no way out of it, we were cornered and we plunged into the water, keeping our faces above the surface. We put wet blankets over our heads for the heat was so intense that our flesh would have been burned if we had not taken that precaution. The roar of the flames was tremendous but we were comparatively safe.

"Once I raised the blanket a little to peek and see how the fire was going and what do you think I saw? There was a big bear perched on a rock right at my feet and looking over at me like he was ready to jump. I guess he thought I was a rock. We exchanged glances for a while and I am willing to bet that he wasn't any more scared than I was, but as soon as he recovered from the surprise, he turned tail and away he went. It was the last I saw of him."

CONSERVATION OF PAPER

ECONOMY in the use of paper will release vast quantities of chemicals which are urgently needed.

A pound of paper wasted means from 1 to 3 pounds of coal wasted.

Cutting down the use of paper 25 per cent would mean 6,000,000 tons less freight for the railroads to haul and would at the same time save 2,500,000 tons of coal.

Old magazines, books, stationery, etc., are used in making books, writing, and other forms of paper.

Paper that comes around purchases at the store is made over again into new paper, cardboard, cartons, paper boxes, paper bags, etc.

One hundred pounds of soft white paper shavings will make 90 pounds of new paper.

One hundred pounds of old magazine paper will make 80 pounds of new paper.

One and one-half million tons of book and writing paper were made last year from old paper.

One hundred pounds of old folded newspapers will make 85 pounds of new paper box board.

Two and one-half million tons of various kinds of paper box board were made last year from old paper.

One hundred pounds of old cotton rags will make from 65 to 75 pounds of paper pulp; this pulp will make only 2 per cent less than an equal amount of paper.

One hundred pounds of new cotton rags will make 80 pounds of paper pulp.

One hundred pounds of old collars, cuffs, pillowcases, or sheets will make 80 pounds of new paper.

Woolen rags are converted into shoddy and shoddy converted into wool. The shrinkage from shoddy to wool is the same as from raw wool to finished wool, namely, about 3 per cent.

One hundred pounds of wool saved or reclaimed provides sufficient material for 25 suits of clothes.

TREE PLANTING TAKEN UP BY MANY EDITORS

NEWSPAPERS OPEN COLUMNS TO DISCUSSION OF LIVING MEMORIALS AND
"ROADS OF REMEMBRANCE" IDEA

READERS of the *New York Times* find the columns of that paper have been opened to a discussion of the merits of roadside tree planting. The *New York Times* had a fine editorial on the American Forestry Association's campaign for "Roads of Remembrance" in which it said: "The American Forestry Association is doing good service in linking the causes of roads and forestation. The Road of Remembrance and the shaded highway have a more intimate connection with the general problem of reforestation than may at first appear. Very soon they will become bases for the advance of veritable armies of trees. Nature unaided may be sure, but she is slow. The industrious squirrel carries acorns, hickorynuts, walnuts and chestnuts a rod or so before he buries them—and fortunately often forgets his cache. The winds carry the seeds of maple, pine, and linden a little further. But for reasons at which the forester can only guess there are vast prairies and waste lands without a useful tree. The shaded highway will cross them and the shade trees will scatter their seeds and nuts in the nearby country.

"He who plants a tree is building the world of the future. In twenty years a maple will grow to a sturdy tree, with dense if not widespread shade. And in that time, when wind and soil are favorable, it is already parent to groves of young maples marching from the highway across lands that have hitherto been waste."

This brought out many letters from readers who advocated fruit and nut tree planting. The *Times* has devoted several editorials since the first one answering some of the letters and sticking mainly to the planting of shade trees. The first letter printed was from Alida (Countess) von Krockow who pictured the roadside fruit trees of Europe. George J. Horowitz, formerly of the Ambulance Service with the French Army, wrote about the virtues of the French roads. Dr. Robert T. Morris contributed a letter, as did Henry Woodward Hulbert on the planting of trees. The *Times* gives the members of the American Forestry Association a first hand lesson on what can be done if the members will take up these subjects with their newspapers. The editors are keen for just such discussions and while they may not always agree with the writer they are glad to give space to constructive thought. Every member of the association should discuss the need of a national forest policy with the editor of his paper and tell him what the American Forestry Association is doing.

Forty Maples.

A Yankee farmer fourscore years ago
Set forty maples by the highwayside;
Twenty tall saplings stood in either
row;

The farmer viewed them with a silent
pride.

They grew apace; there children school-
ward bound

Loitered in spring to pick the blood-
root flowers;

There many a bird found sanctuary
ground,

And laborers refuge from the sudden
showers.

They waxed in size and beauty when the
beams

Of our mid-summer sun's unpying
beat;

Here dusty drivers paused to rest their
teams,

And cattle sought a shelter from the
heat.

They statelier spread; when autumn's
pageant came,

And all our valley donned its festal
dress,

Rose forty pillars lit with crimson flame,
To stir man's spirit by their loveli-
ness.

But years passed, and the farm fell to a
hind—

A prosperous, pushing hind from
overseas,

Who, with the full contempt that marks
his kind,

Felled in his blasphemy those forty
trees.

At times like that one's peaceful spirit
longs

For the fierce justice of an elder day,
For the stern sense that trifled not with
wrongs,

And did not deem that punishment is
play.

Who, save for need, destroys a goodly
tree,

Does mischief; and who wantonly
may kill

Forty such trees does murder, and
should be

Hanged forty fathom high on Gallows
Hill.

—G. S. B. in the *New York Tribune*.

In the *Review of Reviews*, Elbert Francis Baldwin details the devastation in France and Belgium and tells of the plans of the American Forestry Association for helping in the restoration of these forests. Dr. Frank Crane, who writes for a syndicate of newspapers, has devoted another editorial to forestry, this time to the "Roads of Remembrance" idea and also urges co-operation with the Association in its work abroad. This editorial appears in such papers as the *Chicago Daily News*, the *New York Globe*, the *Washington Star*, *Philadelphia Bulletin*, *Atlanta Journal*, *Kansas City Star*, *Cincinnati Times-Star*, *Buffalo News*, *Pittsburgh Chronicle-Telegraph*, *St. Louis Star*, *St. Paul Dispatch*, *Des Moines Capital*, *Milwaukee Journal*, *Sacramento Bee*, *Dallas Times-Herald*, *Omaha World-Herald*, *Binghamton Press*, *Houston Post*, *Richmond News Leader*, *Oakland Post*, *Boise Statesman*, *Baltimore Star* and many others. Here is where the members should co-operate with the Association by writing an appreciation to the editor of the paper in which such features are used. *Leslie's Weekly* has a generous editorial on the value of tree planting and the *New York Herald* takes up the question of better fire protection for forests by saying "with summer fires of unusual severity sweeping the extensive timber lands of Montana, Idaho and Washington, the American Forestry Association is urging the lumbermen to forward their views as to the steps to be taken for the better protection of the woods." The *Herald* then goes on to point to the losses.

The *Trenton Times-Advertiser* devotes a long editorial to roadside tree planting and points to the fact that "if this work is properly carried out it would mean in time a memorial highway across the United States. No finer memorial can be built than a tree bordered highway and aside from tender sentiment connected with such an undertaking there can be no better investment for any community." The *Denver News* calls attention to the fact that the "president of the American Forestry Association has issued a call to the people to beautify their highways as memorials to the men who fought for world freedom. Good roads and tree planting go hand in hand. Federal and local authorities are attending to the road building but it will require voluntary citizen effort to get trees planted." The *Washington Times* points to the famous Potomac Drive made famous by its trees and adds "here is a logical proposition. The roads are to be built. A

road is more than a way to get some place." The subject of permanent Christmas trees that has been urged by the Association is taken up by the *Milwaukee Journal* under the heading "Waste of Good Timber," the *Hoboken Observer* and the *South Bend News*. The *Milwaukee Journal* says on this point:

"Trees adapted to Christmas use have survived the ills and perils of infant life. Barring accidents, they are sure to live grow, and flourish. It is savagery, if one views it rightly, to destroy them. Yet men who would not harm a full-grown tree hack down treelings without pity or remorse. But if we are to have trees for all time, young trees must be saved."

"The idea of planting trees as memorials for our soldier boys who will not return is a beautiful one," says the *Ohio Farmer* as we find it quoted in the *Fredericktown, Ohio, Press*. "The Christian Endeavor Societies have been making a concerted movement toward planting memorial trees at the original suggestion of the American Forestry Association" the *Times Journal* of Bowling Green,

Kentucky, points out. The *Kansas City Star* wants to know "why a billion dollar town is content to look like thirty cents?" And points to the city's shabbiness in the way of vacant lots. Prompt action is urged by the *Hamilton News*

or we will find "this country will have committed economic suicide," says that paper in urging a national forest policy and fire protection for our forests. The *Journal* of Portland, Oregon, reprints the editorial from the *New York Times* on the work of the Association with a letter from I. N. Lipman, an enthusiastic Oregonian, who points out the advertising Oregon is getting because of its good roads. "Replenish the forests," says the *New Orleans Item*, and points to what Kansas and Illinois, known as prairie states, are doing in foresting the land. "It is a melancholy fact," says the *Item*, "that few persons are willing to take steps in time to keep a natural resource from becoming exhausted."

The *Burlington, New Jersey, Enterprise*

has had two editorials on forestry and reprints the editorial from the *New York Times* in full, with a two-column head and the Western Newspaper Union has sent out a special feature on "Roads of Remembrance" illustrated with several pictures. "Grit" uses a half-page feature on memorial tree planting and the International Syndicate of Baltimore has used half-page articles on forestry in general and memorial tree planting several times. The news services, the Associated Press, the United Press, the International News Service and the Universal Service are all using news stories of activities in forestry. The *Christian Science Monitor* used a half column on the need of a national forest policy, and followed it with an editorial on the "World Call for Wood," which concludes that the "need of the hour is to overcome the inertia that has always operated to keep the adequate handling of the forest situation in this country behind the actual requirements." In opening the editorial the *Monitor* points out that "what the people of the United States could accomplish if every

Concord *Monitor* says, "had the forest policy of this country been what it should have been we would have timber for ourselves and for Europe and to spare." The *Houston Post* is of the opinion that "what the country needs is a strong movement to induce the planting of trees similar to the movements that have resulted in such increased production of food for war purposes." The *San Francisco Chronicle* takes up the "Hero Grove" in Golden Gate Park at length. The *Boise Capital News*, in an editorial on the planting of memorial trees by the war mothers, says: "Though the final dedication may be a great public affair, there is something singularly appropriate in this private planting of trees by the people who, when all is said and done, care more than anybody else."

The *Manufacturers' Record* of Baltimore seldom has an issue in which the subject of forestry is omitted. The *Chicago Tribune* has taken up the question of the Forest Preserve near Chicago and calls upon the people to help preserve it by keeping their hands off the beautiful things in the pre-

serve. To quote the *Tribune*: "Why worry about the extinction of the bison and elk and not care a continental whether the things which are native hereabouts live or die?" The lack of shade trees along Harrisburg's streets is the subject

FAMOUS ELM SAVED IN HUNTINGTON, INDIANA.

The famous Elm Tree at Huntington, Indiana, has been saved by the entire change of architect's plans for a church which is to be erected by the Christian Science Congregation of that city. In a report to the American Forestry Association Daniel Shaeff, who led the movement to save the tree, announces that the architect, Samuel A. Craig, will so redraw his plans that the tree will be left with plenty of root space, and that he will leave out the organist's room and the Sunday School classroom in order that the branches may have plenty of space. This movement, in which the congregation is glad to join, is perhaps one of the most unique ever adopted in order to save a tree. The picture of this tree appears on another page of the magazine.

person having an interest in land would intelligently and persistently raise the trees which his land could conveniently allow space for, has never been measured, unless, negatively, through the obvious waste of tree opportunities every where." It would seem the editor had every member of the Association in mind when he wrote that sentence and a more urgent call for co-operation could scarcely be phrased.

In Montreal the *Daily Star* deplores the fact that trees are fast disappearing from the streets of that city and calls for action. In the *Atlanta Constitution* we find continued co-operation with the Association in an editorial on the terrors of a forest fire. The *San Diego Sun* urges that a tree be planted every time one is cut down and the

a stirring editorial in the *Evening News* of that city. The *Bethlehem Times* is devoting as much as a column a day to features from the American Forestry Association. The *Worcester Post* is urging the planting of memorial trees in that city and has asked the Association for all data on the subject of tree planting. To print a list of the newspapers using news from the Association would be to print the directory of such publications. The greatest of opportunities for members of the Association is at hand. Their co-operation will bring forestry to the front in each locality. Now is the time to act by writing to your editor and sending to the Association anything you see dealing with the forestry problem.

TO SAVE CALIFORNIA REDWOODS FOR AUTO ROADS.

A movement has been started to save the California redwoods along the roads. "The plan is for the purchase by the State of a strip on either side of state roads in the redwood country, along which the giant trees shall be left untouched," says the *San Francisco Chronicle*, "as a memorial of the great groves of the past and a keen delight to the traveler through that region." Edward E. Ayer, of Chicago, who motors through the region every year, has reported to M. H. de Young of San Francisco that in some sections "a battlefield could not look worse than where the lumbermen have been cutting down these giants of the forest."

SUMMER WALKS IN THE WOODLAND

ALONG THE PALISADES IN THE INTERSTATE PARK

BY J. OTIS SWIFT, AUTHOR OF WOODLAND MAGIC

(PHOTOGRAPHS BY THE AUTHOR)

THERE is an order of holy men who go about the world doing good to inanimate things. You will know them by the far-away, detached look in their deep eyes when you meet them in the crowded streets, and by the way they have of looking away over the roof-tops as if used to great spaces and lofty mountains. You will come upon them in the waste places, in the shade of the deep woods, on the margin of the brook, the pitcher plant-haunted, quaking peat of the bog, and walking lonely hill paths in the cool of the evening. Then you will discover that the far-away look in their eyes has gone. In its place is quick flashing attention to every drooping leaf, bent twig, lichened ledge, rabbit path and flitting thrush. These men are priests of the Order of Nature. Sometimes they are old and bent, with palms calloused by the plough handles and the pruning hook. Again they are youths with soft treading feet and poet's mouths. But all are holy, for they have received their initiation as children in the secret places of the deep forests and their lives, among other things, are consecrated to loving, appreciating and caring for inanimate trees, shrubs, plants and mosses that animate nature—insects, birds, animals and men, may be happier. This is the ancient order to which Phny, Linneas, Asa Gray,

Donald Mitchell and Thoreau belonged, and to which you and I are initiates. Its members are the sort of men of whom women, children, dogs and wild creatures are never afraid and are usually trustful and fond. There is a secret bond of fellowship between them and every living thing in the wilderness and waste places. So come, this September morning, and we will make a pilgrimage from Hastings-on-Hudson, across the river to the

great Palisades Interstate Park, the most weirdly beautiful spot about the American metropolis.

This park is being developed by the Palisades Interstate Park Commission representing both States of New York and New Jersey, with jurisdiction along the west bank of the Hudson from Fort Lee, New Jersey, to Newburg, New York. The Commission has acquired

all of the Palisades section extending up to the tops of the cliffs from Fort Lee to the State line opposite Hastings, and it is a little out of this wonderland we will visit today, for we cannot hope to explore the summer camp for the military training of youths south of Nyack, rugged Hook mountain at the top of the Tappan Zee, the big Bear Mountain tract a few miles south of West Point, or the Harriman Park section of 30,000 acres running west from the Hudson towards Tuxedo, all in one day. This great park, as wild and romantic in places as a bit out of the heart of the Rockies, has been made possible through money and land appropriated by New York and New Jersey, through the gift of 10,000 acres of land and \$1,000,000 by Mrs. Mary W. Harriman, and gifts by other individuals of various parcels of land, an aggregate of nearly \$2,000,000. It all lies at the doorway of New York City so that a scrub-woman may spend



ONE OF THE NEW AUTOMOBILE ROADS WINDING ROUND THE MAJESTIC CLIFFS OF THE PALISADES.

her day-off in forest depths under the shadows of the frowning palisades for a few pennies and a few minutes' time in getting there on the ferry.

We go down to the wide blue river at Hastings, and row over to the shadow of the cliffs, dropping down with the tide to Alpine, opposite Yonkers. We are seeking solitude, and find it in spite of the fact that thousands of people landed here at Alpine last Sunday and were

swallowed up by the precipitous paths, jungles and hillside forests in a few minutes. We have certain things to say to Mother Nature, and must sit in front of stone altars in inner recesses of the vast rock-heaps at the foot of the purple crags, jumbles of broken trap from the size of a man's head to a house, hurled down by frosts



THE ENTRANCE INTO ONE OF THE HUNDREDS OF BEAUTIFUL WOOD PATHS IN THE PARK.

of untold ages, and make our confession. We must ponder upon the persistence of this thing we call Life and which is all around us from the crawling partridge berry vine, woodbine and honeysuckle, binding the rocks together, to the earth currents palpitating in the solid ledges and rising with the sap in giant old oaks, tulips, black birches, and sycamores, towering above. Leaving the little white house that was Cornwallis' headquarters in the Revolution, and nestles now at one of the nine docks for steamers at the foot of the Palisades, we plunge up a tiny hidden foot path toward the bottom of the crags. A scarlet tanager flutters along ahead to lead us away from her nest, discovered at the end of a black birch's limb. A chipmunk sits on a mossy log and stares, and a gray squirrel scolds from a black oak. At once we are as far from civilization as if we were lost in the Adirondacks. From the shore of the river the fallen rock debris rises at an angle of forty-five degrees or so, several hundred feet in places. Ages of erosion that started, perhaps, with the deluge, leaf-mould from centuries of vegetation, earth deposited when the Hudson was an unthinkably big stream, draining the Laurentian

hinterland, cover stretches of the rock heap. In this grow all—I am sure—of the trees and shrubs indigenous to the locality. Then, rising majestically in sheer wall, fissured battlement, detached pinnacles and weather-scarred, time-colored precipices, to a height of between 300 and 500 feet, begin the Palisades. They are of a lava rock called trap which was penetrated as a sheet into the Triassic sandstones. Next to Niagara Falls they form one of the most widely known natural phenomena in America, probably because of their nearness to one of the world's great cities. The awesomeness of their dizzy height as we look up, contrasted with the simple sweet beauty of beds of wild spikenard or False Solomon's Seal, tall meadow rue, bloodroot, wild ginger, white baneberry, black cohosh, wild bergamot, pipsissewa, and clumps of mountain laurel, pink azalea, bayberry, blueberry, black-cap raspberry and blackberry, growing all around, appals us. The beautiful twelve-mile fringe of sloping land

under the Palisades is a paradise for artist, naturalist and geologist. Although the State Commission of Conservation, headed by George W. Perkins, has spent much money and done an incredible amount of work building



AT THE FOOT OF THE CLIFFS STILL STANDS THE QUIANT LITTLE WHITE-WASHED HOUSE WHERE CORNWALLIS, IN LONG GONE DAYS, MADE HIS HEADQUARTERS.

bathing beaches, lawns, boat lagoons, winding paths, automobile roads, log comfort stations, bridges, piers, masonry walls, causeways, and monster rustic pavilions that would have decked a Roman emperor's gardens, the vast wilderness of the park remains untamed and is its greatest asset. "The Commission is doing its best to

preserve the great natural beauties and advantages which God in His wisdom conferred upon the land over which it has supervision." Here and there, lost in the tangles of sumac, wild cherry, black haw, alspice, sassafras and elderberry are deserted, tumbled-in cellars of colonial houses that were places of importance when the Red Coats were chased across the river by Washington's troopers, but now overgrown by woodbine and wild grapes. The pink and white roses of the colonial women, planted to celebrate the



ON THE LIP OF THE CHASM—FAINTLY VISIBLE IS THE OPPOSITE SHORE LINE AND A STEAMER WENDING ITS WAY UP THE BEAUTIFUL HUDSON.

love of happy homes, have gone wild and bloom luxuriantly, running back to Nature. An hundred old fashioned herbs and flowers that in the course of almost three centuries have escaped from the gardens up over the cliff tops have dropped their seeds over the dizzy edge and taken root below. It is a bird, animal and tree sanctuary, we find as we leave the path two hundred feet up and turn along one of the new automobile roads the Commission is cutting under the lower edge of the cliffs. We climb up over the slides of broken trap to the top of the age-old crags at one of the places where ascent is possible and creeping tremblingly to the lip of the chasm look away south to the great city sweltering in its heat and noise, to the ships dotting the harbor and



LOOKING DOWN ON THE DOCKS, HALF A THOUSAND FEET BELOW. THIS SPOT AT THE TOP OF THE PALISADES AFFORDS A MAGNIFICENT VIEW OF THE SURROUNDING COUNTRY.

river, down to the dock half a thousand feet below us; to Yonkers across the stream, to Graystone once the home of Samuel Tilden, just above; to Hastings where Farragut lived; Dobbs Ferry where nestles on the hillside the home of the late Robert G. Ingersoll; Irvington,

the home of Washington Irving, and Mystic Sleepy Hollow lost in the blue haze beyond Tarrytown. Five miles above us on the west side of the river, glancing along the Palisades, rises Indian Head, the highest shelf of the cliffs, the profile of the old savage, tossed there, it is said, from a blanket in the hands of Hendrick Hudson's sailors, looking out of the crags in surprise at the changes since his descendants sold their heritage to the Dutch West India Company for a mess of pottage,



THE PATH WINDING ROUND THE CLIFFS, FROM WHICH DELIGHTFUL GLIMPSES OF THE RIVER FAR BELOW MAY BE HAD.

or a blanket, or something. It is all overpoweringly beautiful and inspiring, and we know we can never adequately describe it, but as we look there comes up from a treetop growing out of the rocks below us the clear sweet music of a song-sparrow saying, "tweet, tweet-flitter," which is nonsense, but heavenly music nevertheless, and far more indescribable than a marvelous landscape. Descending the crags to where in a deep cool nook, among broken rocks as big as hayracks, a spring pours out, cold and crystal, for our blessing. We drink, and lying on the mosses, staring up at the cliffs and blue sky beyond, feel our littleness. Here in the silence the spirit of the place comes to us like a quiet caress. As the sun sinks behind us we go down winding roadways and paths, among deep forests with occasional glimpses of the river below caught through openings in the dense mat of treetops where the thrushes chant, to the landing—drifting home in our boat on the broad silver river in the moonlight.

MEXICO AS A SOURCE OF TIMBER

BY AUSTIN F. MACDONALD

A FEW years will often work startling transformations in the motives and desires of a people; and not the least wonderful is the change which was wrought in the lives of the American people by our participation in the great world conflict. In 1916 we were busily engaged in the absorbing task of making money, we were looking for profitable opportunities to invest that money. In 1918 our sole aim was to win the war, and foreign investments, no matter how alluring, did not appeal to us. But now America has emerged triumphant from the struggle, and the present time marks the dawning of a new era of prosperity. Once more American capital is seeking satisfactory opportunities

valued at \$495,257. While these figures are not large when considered by themselves, relatively they are very important, for the forest products during the year 1913 formed approximately one-eighth of the total exports of the country. We must not conclude, however, that a comparatively small export of lumber means a lack of forests in Mexico. On the contrary, it merely signifies that the great forest areas have not yet been developed and are still awaiting exploitation. The Republic has been estimated to contain 479 square leagues of thick forests and 18,134 square leagues of wooded land. Its forests are rich in every variety of the precious woods, besides great areas of commercial timbers. Because of



for investment, and intelligent information on this subject is rapidly becoming an urgent need.

There is, perhaps, no bit of advice which the American business man has heard more frequently in the past than the suggestion to invest in Mexican timber. Just what kind of timber, and in just what part of Mexico, seems to have been entirely immaterial. Strangely enough, enthusiasm about this timber seems to have been in inverse ratio to the actual amount of knowledge concerning it. The purpose of this article is to state concisely the extent of Mexico's timber resources, and the location of these forested areas.

In the year 1913 the Republic of Mexico exported commercial timber valued at \$3,365,131, and dye woods

the lack of laborers and the difficulty of transportation, and because of the presence of precious metals, exploitation went on very slowly for over two centuries. Now, however, the people are beginning to realize the vast wealth of their forested areas and are developing them at a rapid rate. Wasteful methods of hauling and cutting which are at present being employed will if continued lead to deforestation. More scientific exploitation is needed, and it must come quickly.

One must not conclude from these introductory remarks that all Mexico is one vast forest. There are great stretches of waving grain and of the crops of a more tropical agriculture, and there are vast areas that are uninhabited deserts. For the purposes of this paper

the country may be conveniently divided into three districts. The first of these is the great tropical forest belt. This covers almost the entire peninsula of Yucatan, as well as the small states of the southeast which border on the Gulf of Campeche. Some tropical woods are also found along the Pacific littoral in the far southwest.

The second area is the Temperate Zone Forest Belt. This is located in the northwestern section of the Republic, extending northward almost to the American border. It begins from 100 to 150 miles west of the Pacific coast, and extends eastward over a large strip of territory. Between these two districts is the Treeless Belt, some of which is cultivated, but much of which is arid.

It is from the Tropical Forest Belt that logwood and the other dye woods come. Logwood is found in the southern part of the State of Yucatan, which is in the extreme north of the peninsula of that name along the Gulf of Campeche, and over the entire eastern section of the peninsula. Its exploitation has been neglected for several years. Since the demand for the product was revived, however, several ineffective attempts have been made to resurrect the industry in the Peninsula of Yucatan. These in many instances have not survived the effort to obtain sufficient labor. In the forests of Quintana Roo there are piles of cut logwood which are not available because laborers cannot be obtained to haul them. This difficulty, coupled with the inaccessibility of the product, makes exploitation very difficult, and to a large extent impracticable at the present market price. A lack of vessels is another difficulty which must be met when the product finally reaches the town of export. This logwood is used for dyeing materials and in the manufacture of ink. The largest exportation of the product at present is from the State of Tabasco, which borders on the Gulf of Campeche. This is practically the only export of the state. During two months in 1916, 4,371 tons were exported, valued at \$327,127. All of it was shipped to the United States.

In the Tropical Forest Belt are also found mahogany, ebony and other precious woods. Along the Gulf of Campeche, particularly in the southwestern part of the Peninsula of Yucatan, are great forests of mahogany and Spanish cedar. These are chiefly in the hands of American and native companies, who export considerable quantities. From July, 1911, to June, 1912, mahogany and Spanish cedar, valued at \$1,236,000, were shipped from the small town of Carmen alone. Large areas of the cedar are also found in the interior of the peninsula, but a lack of transportation facilities has made their exploitation almost impossible up to the present time. All along the eastern coast of the Republic, particularly in the southeast, although to a lesser extent further north as well, are found tracts of mahogany in paying quantities. The State of Nuevo Leon, which is situated in the extreme northeast some distance from the coast of the Gulf of Mexico, has the chief area of ebony, which is being exploited rapidly. To the east of Nuevo Leon, di-

rectly on the coast, are large forests of mahogany which have not yet been developed.

By far the largest part of the forest products already exported have come from the Tropical Forest Belt. The Temperate Zone Forest Belt has until very recently been practically undeveloped, and it is from this region that a great increase in the lumber industry may be expected. This area is a broad belt in the northwestern part of the Republic, with its western edge about 150 miles from the Pacific Ocean. The Sierras which traverse Mexico from north to south are well wooded on both their eastern and western slopes. Pine is the commercially important timber, the principal varieties of which, in the order of importance, are yellow short leaf, yellow long leaf and Weymouth. Some oaks, cedars (the kind generally known as cedars in temperate zones) and other hardwoods occur. Thirty-six separate and distinct varieties of hardwoods have been found in the region. In the short leaf pine, trees are quite common measuring from four to four and one-half feet in diameter and running 60 feet without a limb. Spruce and fir are also found in quantity, although pine constitutes approximately three-fourths of the Temperate Zone Forest Belt. The rich timber resources have scarcely been touched, mainly because of inadequate transportation facilities. In the whole region, covering approximately 75,000 square miles, there are less than 1,000 miles of railroads. When new roads which are contemplated or in course of construction have been completed vast tracts of virgin forest land will be ready for exploitation.

One must not imagine, however, that there is at present no development of this belt. Some exportation is now taking place, the timber being mostly white pine of an excellent quality. Turpentine and rosin of a high grade are secured as by-products. In the State of Chihuahua, for example, which is one of the leading lumber states of the Temperate Zone area, the forest products of the State for 1909 amounted to \$1,214,784, consisting principally of pine, \$574,236; oak, \$548,766, and mesquite, \$43,991.

From all of this it may be seen that Mexico has large areas of timber, both of the cabinet and of the commercial woods. Here are splendid opportunities for the investment of American capital, if the problems raised by a lack of labor and of transportation facilities can be successfully overcome. The woods of the Temperate Zone Forest Belt are said to rival in quality those of the United States, and it is only a matter of time when both forest belts will be exploited on a large scale. Is this development to be carried on by American interests, or by the European capitalists who already dominate Mexico financially? American business men must decide.

**CONSIDER THE WOODLOT TO KEEP
IT PRODUCTIVE**

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* This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.

SPRUCE TREE 573 YEARS OLD

IN making a survey of the spruce forests, where the airplane cutting was carried on during the war in the Grays Harbor spruce district, the Forest Service found a tree 573 years old, according to its rings. The tree was felled in clearing to make the military camps safe after a limb had fallen and menaced the roof of the officers' quarters. The tree is close to the Olympic highway, eleven miles north of Hump-tulips.

The stump was 11.6 feet from the ground level. The tree was a sapling some two inches in diameter when Columbus was discovering America. Though not the oldest spruce on record, it is premier in age during the present survey.

An effort is being made by the department to get the age of the largest type of Sitka spruce in each of the various airplane enterprises. More than 500 trees have been listed to date.

BOOK REVIEWS

FOREST MANAGEMENT, by A. B. Recknagel and John Bentley, Jr., John Wiley & Sons, New York, price \$2.60. The book contains a condensed and simple treatment of the following subjects: Forest mensuration, Forest organization, Forest finance, and Forest administration and it is written in such a manner as to be readily understood and used by the layman, timber owner and manager. Non-professional students of forestry in colleges and universities and in professional courses not post-graduate grade, will also find it of value as a text.

Forest Management occupies the middle ground between the highly technical and the very elementary textbooks and intelligent study of the principles advocated in this book will stimulate the practice of forest management by owners of timber land—large and small, public and private—to the end that this important natural resource may be systematically maintained and developed.

RED GUM TREE YIELDS BALSAM OF TRADE VALUE

FEW people in the South, where the red gum tree (*Liquidambar styraciflua*) grows, apparently are aware that the gum which exudes from this tree when its sapwood is wounded has commercial value. This "sweet gum," as it is commonly called, is similar in properties and composition to the commercial product obtained from a tree (*Liquidambar orientalis*) indigenous to Asia Minor and known in commerce as "Oriental storax."

According to the United States Forest Products Laboratory at Madison, Wisconsin, small amounts of the dried gum have been used for some time in the manufacture of chewing gum, but since the war curtailed the supply of oriental storax considerable quantities of the fresh "sweet gum" or "American storax" have been put on the market to replace the imported product.

As much as \$2 a pound has been paid to collectors of the gum and second hands have sold it for from \$2.50 to \$3 a pound. These prices, however, are inflated and it is probable that in normal times the gum would not bring more than 50 cents to \$1 a pound.

Storax is used in the manufacture of perfumes, tobacco, adhesives and pharmaceutical preparations, and contains cinnamic acid and cinnamic alcohol, both of which are in demand.

PLANT MEMORIAL TREES

STATE NEWS

CALIFORNIA

THAT public sentiment in California in favor of forestry is steadily growing is shown by the measures which passed the last Legislature and received executive sanction. Besides the general appropriation bill which carries items of salaries, support and printing of the State Board of Forestry, ten other measures which have to do with forestry in California were passed.

A new board of forestry was created to consist of five persons, the State Forester and four persons appointed by the Governor, one of whom shall be familiar with the timber industry, one with the livestock industry, one with the grain and hay industry, and one at large. Another measure provided for the prevention and suppression of forest fires which are defined as any fires burning uncontrolled on any lands covered wholly or in part by timber, grass, grain or other inflammable vegetation. The State Board of Forestry was authorized to divide the state into districts, employ district fire rangers and pay fire-fighting expenses under specified conditions. It was provided that co-operative agreements for the prevention and suppression of forest fires or for reforestation and afforestation purposes might be entered into with federal, county, municipal and private agencies. An appropriation of \$25,000 for the biennial period was made to put this measure into effect.

In addition, a number of forested and brush-covered regions in the state were given protection through the following appropriations for the biennial period:

Fighting forest fires, etc., in the San Dimas Canyon in the San Gabriel Mountains, \$1,600; fighting forest fires in the San Gabriel Canyon in the San Gabriel Mountains, \$3,000; prevention of forest fires in the San Antonio Canyon in the San Gabriel Mountains, \$5,000; for reforestation, construction and maintenance of fire lines and trails, Angeles National Forest, \$5,000; prevention and extinguishment of fires in Tamalpais forest fire district, \$5,000.

The above appropriations were made on the condition that the various agencies receiving direct benefit from this protection, such as the San Dimas Fruit Exchange, Azusa Irrigation Company, San Antonio Water Company and Tamalpais forest fire district contribute an equal amount.

Law enforcement measures were strengthened through an amendment to the Penal Code that requires an effective spark arresting device to be installed on any gas tractor, oil-burning engine, gas-propelled harvesting machine or auto truck harvest-

ing or moving grain or hay, and the carrying of two suitable chemical fire extinguishers by harvesters and hay presses. The section regarding the leaving of camp fires unextinguished was strengthened by the substitution of the words, "Without some person in attendance" for "upon departure."

A chapter in the Civil Code was revised and now gives the United States the right, heretofore limited to the state and counties, of recovering in a civil action of double the damages sustained from fires through wilfulness, malice or negligence, as well as the actual damages if the fires occurred accidentally, and the full costs incurred in fighting any such fires.

COLORADO

ACTING upon the advice of the State Forester, the State Board of Land Commissioners has definitely committed itself in favor of effecting an exchange of school lands, chiefly sections 16 and 36, lying within the National Forests of the State, for an equal acreage and value of lands to be chosen in one or two bodies within some National Forest, in order that a State Forest may be created and handled under forestry principles.

The State Forester, together with Crosby Hoar, of the United States Forest Service, has examined within the Rout, White River and Arapaho National Forests areas which might serve the purpose of the State. During the summer a crew of National Forest men are examining State lands which have not been examined by the State Forester, and the Forest Supervisors are assisting on other National Forests.

Preliminary to this exchange the State Forester has reported on nearly 28,000 acres of State land within National Forests, but the total area of such lands is approximately 115,000 acres.

The timbered school lands in the past have been administered with great handicaps due to the small areas in single bodies, scattered all over the mountainous portion of the State, and under laws and regulations which were not conducive to good forestry practice.

It is believed that the proposed exchange, which is in a preliminary stage at present, will result, if effected, in marked advantage to the State and in considerable advantage to the United States Forest Service, which will not have to contend with the administrative disadvantages of holding within the boundaries of National Forests certain alienated areas.

LOUISIANA

THE Commissioner of Conservation, with the approval of the Forestry Advisory Board, has formally promulgated the spark arrester regulations called for by the Louisiana law passed in 1918. Louisiana, which has so many excellent forestry laws, feels proud to join those few states in the Union which have laws requiring the use of proper spark arresters and ash pans on the trunk lines and tram roads of the state. So far as we know the regulations for wood-burning locomotives and skidders are the first passed by any state; wood as a fuel is not used to any extent today in logging operations except in the South, where our splendid fat pine knots make a mighty fine substitute for coal. The regulations as issued require coal burning locomotives to be equipped with "cabbage-head" stacks and solid ash pans. The coal-burning regulations require no more than what is already the standard equipment on the great majority of railroads in the United States and are modeled along the lines of the British Columbia and New York regulations. There will be, however, a tightening up of the inspection under our regulations. Skidders and loaders or other portable engines used in the woods must be equipped with screens in or over the smoke stacks.

The way the lumbermen and railroads of the state have co-operated with the Department of Conservation in these matters is a very hopeful sign. Two conferences called by the department in March, one for the tram roads, the other for the trunk lines, were very well attended and gave an opportunity for everyone to be heard. A great many of the tram roads did not wait for the issuance of the spark arrester regulations to begin to install the devices recommended by the conference, but got busy at once and ordered the equipment. Other of the tram roads were found to have used cabbage-head stacks and similar devices for many years and they were unanimous in boosting the department's efforts to eliminate railroad fires.

Never again when the fire warden talks to the Louisiana farmer or stockman about preventing fires in the woods can that individual come back and say "why do you pick on us? These — — dummy engines and locomotives set more fires in a day than we do in a week. Why don't you get after them?" We feel that if the farmers and stockmen will give us as good co-operation as the lumber companies and trunk lines seem to be willing to give us under the new regulations, we shall soon have the fire situation in Louisiana eating out of our hands.

"The Dessert Berry of the Nation"

The Erskine Park Everbearing Red Raspberry



The Erskine Park Everbearing Red Raspberry is a seedling from the old reliable Cuthbert, discovered on the Westinghouse Estate (Erskine Park) at Lee, Mass., by Mr. Edward Norman. This magnificent estate is in the midst of the beautiful Berkshire Hills, with a temperature in winter of 30 or 40 degrees below zero, so that the hardness of this berry is unquestioned. The estate is surrounded by the summer homes of many wealthy people, and much to the surprise of his neighbor gardeners and not without a deal of personal satisfaction, Mr. Norman furnished large, luscious raspberries throughout the fall for various dinner parties.

These berries are commented on by all who have seen and tasted them as the most delicious and best raspberry they have ever eaten. Mr. Baker of Hoosick Falls, N. Y., writes us as follows, regarding this remarkable berry:

"In the season of 1916, Mr. George M. Darrow of the United States Department of Agriculture was traveling from the Atlantic to the Pacific, visiting fruit growers to obtain information on berries for bulletins published by the Department of Agriculture. Mr. Darrow had visited this estate before, and was most favorably impressed that this berry was far ahead of the St. Regis and Renere, and when it became known it would replace these varieties. The plant is by far the strongest growing raspberry I have ever seen. It branches like a tree, and it also has the largest and most roots of any variety with which I am acquainted. It is perfectly hardy and the berries are very large."

Of this berry we cannot say too much in praise, and we predict

that once known, it will be a standard for planting in every garden and considered a necessity.

The Renere and St. Regis have been the standard up to the present time. In the Erskine Park we have a berry that far surpasses either of these; a raspberry that is a delight to eat, each berry being of largest size, with its delicious melting flesh, full of rich creamy juice, highly flavored and sweet as honey.

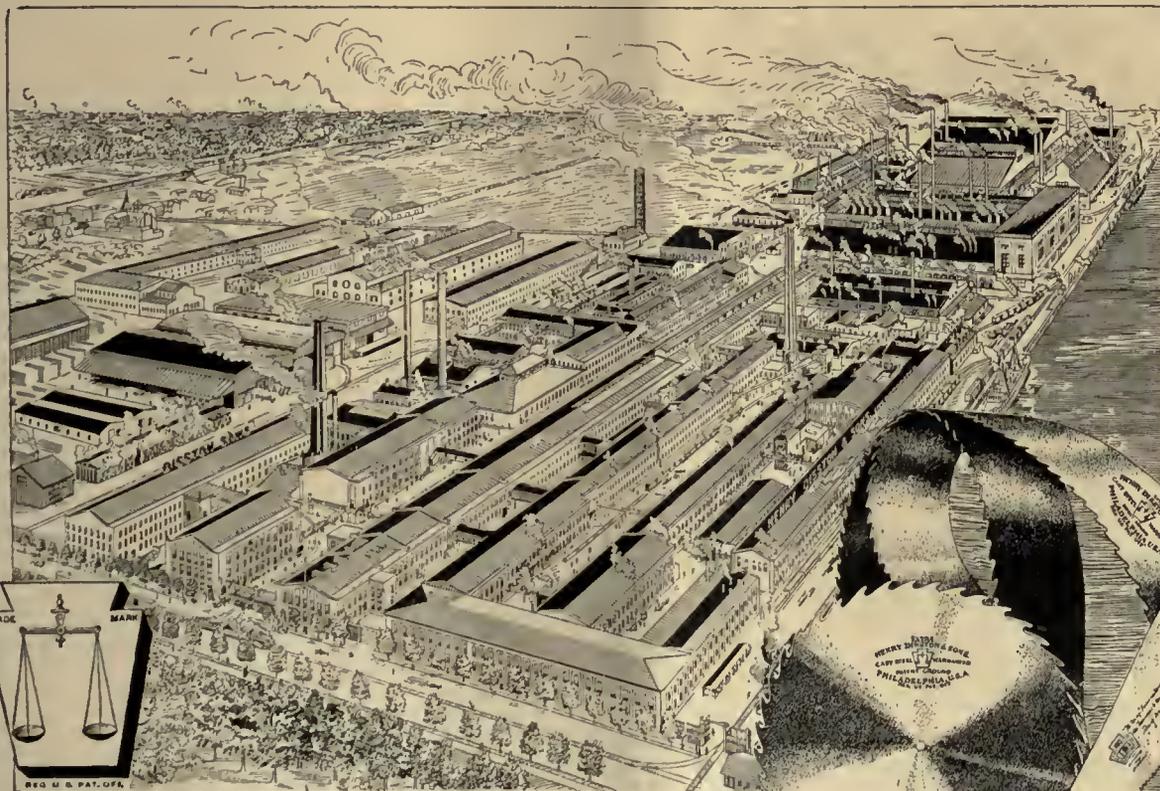
Conceive the joy and satisfaction of having such berries on your table all through the autumn, the source of wonder to your neighbors, that you can pick the finest raspberries until the snow flies. On November the 20th we cut a large branch of the Erskine Park with blossoms, green berries and ripe fruit upon it.

We have not as yet been able to propagate any large quantity of this magnificent berry, but what we have are the finest Bearing Two-Year Old Plants, heavily rooted and branched that will bring a full measure of pleasure and satisfaction to the planter.

Strong Field Grown Bearing Plants, per six, \$3; per twelve, \$5; per fifty, \$15
One dozen plants set this fall will produce more fruit than two dozen plants set next spring. Plant this fall.

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Location and Amount.—All the merchantable dead timber standing or down and all the live timber marked or designated for cutting on the Clover Valley Logging Unit embracing about 26,000 acres in T. 23 N., Rs. 14 and 15 E., T. 24 N., Rs. 12, 13, 14 and 15 E., and T. 25 N., Rs. 12 and 13 E., M. D. M. estimated to be 165,000,000 feet B. M. of yellow and jeffrey pine, 7,500,000 feet B. M. of sugar pine, 49,500,000 feet B. M. of white fir, 4,000,000 feet B. M. of Douglas fir, 450,000 feet B. M. of red fir and 7,500,000 feet B. M. of incense cedar saw timber, more or less located within the Plumas National Forest, California.

Stumpage Prices.—Lowest rates considered, \$3.00 per M. feet for yellow and jeffrey pine, \$3.50 per M. feet for sugar pine, \$1.50 per M. feet for Douglas fir and incense cedar, \$.75 per M. feet for white fir and \$1.00 per M. feet for red fir. For material unmerchantable under the terms of the agreement to be removed at the option of the purchaser, for which payment is required by the Forest Service, fifty cents per M. feet. Rates to be redetermined by May 1, 1924.

Deposit.—With bid \$10,000 to apply on purchase price if bid is accepted or refunded if rejected.

Final Date For Bids.—Sealed bids will be received by the District Forester, San Francisco, California, up to and including October 15, 1919.

The right to reject any and all bids is reserved.

Before bids are submitted full information concerning the character of the timber, conditions of sale, deposits, and the submission of bids should be obtained from the District Forester, San Francisco, California, or the Forest Supervisor, Quincy, California.

MICHIGAN

THE past summer found the compartment line construction work practically completed on two State Forests, the Fife Lake and the Ogemaw. On each of these, a compartment line has been built on the government land subdivision survey lines around each forty acre tract, excepting where swamps or lakes interfere. The Fife Lake Forest contains 7182 acres and the Ogemaw 4284 acres, and the compartment line systems are 112 and 57 miles long, respectively.

In addition to the systems built on these two forests there are some 380 miles on the other State Forests, and the present systems will be strengthened with more line until each forest is equipped as is each of the two mentioned.

These two forests are, probably, the first in America to be so equipped. Since the construction and maintenance of the lines entails considerable cost, it is interesting to note, as offsetting the cost, their value in a general way to the forest in the light of our own experience. To be sure European foresters long ago were satisfied that the construction of compartment lines was essential to the efficient operation of their forests, and the more intensively managed forests of Europe are now well provided.

The lines, as we construct them, are cleared of brush and trees to a width of sixteen feet, all stumps are removed to a width of twelve feet, and a strip ten feet wide is plowed and harrowed. The line is reharrowed or is disced as necessity arises, to remove all grass, ferns, brush, etc., which may start on it. A clean dirt road results. They are the streets of our forests.

As streets they serve the same purposes and have much the same relative value to the forest as do the streets to a city. Along them, one may quickly drive to any fire which may arise, and as the streets of a city act as barriers to the spread of fires, and as bases from which fires may be fought, so do the compartment lines of the forest. Indeed, their value as a means of protecting the woods from serious damage by forest fires is, perhaps, their greatest value at present, and as their use for this means is readily observed, they are generally called fire lines. It is along the compartment lines that telephones are strung, and it is they that, in large measure, bear the vehicular travel over the forest.

The compartments correspond in boundaries with the government land subdivisions, and as each land subdivision is described, so is each compartment line bounding it. Thus we have as names for our forest streets, the names of subdivision lines, for example: north eight line section 36; east and west quarter line section 2; line between sections 11 and 12; etc. The name of the line indicates its precise position in the forest.

The forest is, by the lines, divided and

marked out on the ground (not along on a map) into units of area suitable for administration purposes. If the Custodian wishes to plant a compartment with young trees, he knows that the area is bounded by compartment lines, and that its location is unmistakable; also that he can get to it with a team, if, indeed, not with his Ford.

If the State Forester wishes to undertake special surveys or studies or examinations on any particular piece of land, he knows that he can reach it quickly, and that the ease of his work will be immeasurably heightened through the use of the compartment lines. It is only the forester who has hunted for section corners and lines in order that he might locate his position, who can really appreciate this one value of the compartment line system in the efficient conduct of a forest business.

The Forestry Section of the Michigan Agricultural Experiment Station is making a study this summer of the rate of growth of forest plantations and also nut tree plantations. The study includes costs of establishing, care and maintenance and also intermediate and final returns where possible. The results of the study will probably be published some time during the coming winter.

The Michigan Legislature recently passed a law to encourage the planting of nut-bearing and other food-producing trees along State trunk highways and other roads built in this state. The law makes it the duty of the State Highway Commission and the State Commission of Agriculture to look after the setting out of such trees and of the State Agricultural College and the Public Domain Commission to distribute stock at nominal cost to local officials and private individuals who will set it out. Trees are to be planted at intervals of 20 to 40 feet along the roads. This law is in keeping with the policy of encouraging tree planting announced by the U. S. Department of Agriculture.

NORTH CAROLINA

TEN years ago the United States Forest Service, in co-operation with the North Carolina Geological and Economic Survey, made a study of the Wood-using Industries of the State, the results of which were published by the Survey as Economic Paper No. 20, "Wood-using Industries of North Carolina." This report is now out of print and as there is a continuous demand for information on this subject, the Survey has determined to revise thoroughly and bring up to date this report and publish the results in connection with the forthcoming bulletin on the "Forest Conditions of Piedmont North Carolina," in which portion of the State most of these industries are situated.

Inquiry cards have been printed and are being sent out to a revised list of firms ask-

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Westchester County,

ing information as to the amount, kind, quality and value of wood used, and the amount and kind of products manufactured. A special effort is being made to compare the past with the probable future source of supply. Ten years ago North Carolina furnished ninety-six per cent of the wood used in her industries; it will be interesting to see to what extent this has been changed by the undoubted rapid reduction in the amount and quality of timber available.

Besides the several large summer schools, covering six weeks study, in session at the higher State institutions of learning, there are being held this year for the first time some forty-five schools of four weeks duration for teachers, under the joint control of the State and County authorities. The attendance and the work accomplished at these local schools have been most encouraging. It is at these summer schools, held usually at the county seats, as well as at the Teachers' Institutes (two weeks term), that the State Forester is lecturing. With a lantern and a set of slides, he is visiting the majority of the summer schools in the Piedmont and eastern sections of the State. The general topics are "conservation" and "forestry" as they apply especially to North Carolina conditions. An outline of the different forest types is given, the uses of the forest touched upon not only as to their products, but their value

for recreation and for soil and water protection; while forestry practice for this State is illustrated and explained. Suggestions are made to the teachers as to how they may interest the children in the observation and study of trees by excursions, school collections, Arbor Day observance, etc. They are urged to recommend the planting of shade trees around schools and homes, the reservation and planting of roadside trees and the planting and dedication of Memorial Trees.

OREGON

AT a recent meeting in Portland, Oregon, of the trustees of the Western Forestry and Conservation Association, plans were ratified for reorganizing the scope and personnel of the association to cover far more broadly than ever before both the western protective work and the economic problems confronting the entire industry.

Favorable action was taken on a co-operative plan proposed by the Oregon Forest Fire Association, under which Col. C. S. Chapman, manager of the latter, will take charge of all the fire and similar local work in the five states. The five-state association will furnish him assistance to develop technical fire fighting methods and law enforcement, also increased facilities for educational work with industry and public on protective matters.

Besides these increased activities in the

Northwest, the Western Forestry and Conservation Association will engage more constantly, both independently and in co-operation with the National Lumber Manufacturers Association and other lumber and timber organizations, in working out larger industrial questions and in getting recognition of western needs from governmental agencies. By being relieved of western fire matters, E. T. Allen, who has spent much of the past three years in Washington, will devote himself almost entirely to this work in the east. Much of his earliest attention will be given to relations between the lumber industry and the Treasury Department in working out the new revenue laws affecting income and profits taxation.

PENNSYLVANIA

FORESTER Paul Mulford, in charge of the Stone Forest and Asaph nursery reports that he is raising seedlings in his nursery from seed collected from white ash trees which were set out in a plantation on the Stone Forest in 1907. The trees bore their first seed in 1914 and have been prolific seeders each year since then, except in 1918 when a late frost killed the immature seed. He also reports a heavy attack of white pine weevil, especially on southern exposures, and states that European larch under an advance growth is making only about one-fourth as great a height growth as in the open.

FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

POSITION wanted by technically trained Forester; college graduate, 37 years of age and married. Have had seven years' experience in the National Forests of Oregon, California, Washington and Alaska. Also some European training. At present employed on timber surveys as chief of party in the Forest Service. Desire to make a change and will be glad to consider position as Forester on private estate, or as city Forester. Will also consider position as Asst. Superintendent of State Park and Game Preserve in addition to that of Forester. Can furnish the best of references. Address Box 820, care American Forestry Magazine, Washington, D. C.

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

An Opening For One Hundred Foresters

The position is that of Division Firewarden; the territory is approximately one-third of the State of New Jersey; the work is general administration of all forest fire matters together with attendance at large fires, investigation of the causes of fires, supervision of the personnel of the local firewarden service, about one hundred men, and responsibility for the publicity and propaganda fire prevention work in the territory. The compensation is \$1,200 to start, with every likelihood of increase shortly, the qualifications are that a man shall be a graduate of some reputable technical forestry school. The reason for requiring technical training is that advancement may be either in the forest fire work or in the technical forestry activities of the Department and in addition the incumbent is called on during the slacker season for forest fire work, to do technical and propaganda forestry work in his territory. Apply Box 830, care American Forestry, Washington, D. C.

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, Care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, Care American Forestry Magazine, Washington, D. C. (1-3)

Man to be discharged from the Army September 30th desires position in forestry work, with lumber or railroad company or assisting in investigations of utilization of wood products. Would accept position in other work. Is married man, graduate of Michigan Agricultural College, 1913. Has had experience in orchard work, clearing land, improvement cuttings, planting and care of nursery, pine and hardwood transplants, orchards and larger trees, grading and construction of gravel roads, and other improvement work. Has executive ability and gets good results from men. Please address Box 860, care of American Forestry Magazine, Washington, D. C. (9-11)

Forester A. C. Silvius in charge of the Buffalo State Forest in Pennsylvania has established a recreation park within his forest. It has been named Crystal Spring Park, covers an area of about three acres, and is located on one of the main highways of the State.

A forestry literature box has been installed in which popular publications on forestry are placed. These publications

are a source of recreation to the visitors during their stay at the park, and a means of disseminating information pertaining to forestry, for the publications are free of charge and may be taken home by the visitors. Approximately 2,000 bulletins and leaflets have been distributed during the past four months. Forester Silvius is using this practical means of convincing the guests who visit the park that he is trying to give them real service and the Buffalo Forest is open to the public and being developed so that it will yield large quantities of desirable wood and furnish the best form of recreation to all who are fortunate enough to visit it.

District Forester Walter D. Ludwig, Johnstown, Pennsylvania, reports that a number of destructive forest fires occurred during the first week of July. At this season of the year forest fires are usually rare, but on July 4 a fire started which destroyed more than \$1,000 worth of pulpwood belonging to the West Virginia Pulp and Paper Company.

Hereafter any person who desires to make a business of pruning shade trees in Johnstown, Pennsylvania, must pass an examination given by District Forester Walter D. Ludwig. If the applicant satisfies the requirements of the examiner, a license is issued to him upon the payment of a one dollar fee.

VIRGINIA

SEEDLINGS and transplants for reforestation in Virginia will be available for the first time this fall planting season from the Virginia State Forest Nursery.

Evergreens are being grown exclusively up-to-date. They include three species of pine and Norway Spruce. The pines are the well-known white pine (*pinus strobus*), which is native throughout the mountainous parts of the State and the higher parts of the Piedmont section; the shortleaf pine (*pinus echinata*), which is the predominant tree in the Piedmont section of the State, and is also found over much of the mountainous part; and the loblolly pine (*pinus taeda*), which is decidedly the predominant tree in the Tidewater or Coastal Plain section of the State, and occurs scatteringly, and grows rapidly in the Piedmont section of the State. These three pines are expected to predominate in reforestation in Virginia, each in its own section of the State, because of their rapid growth, dense stands, and early and large yields of much-needed material.

The Norway spruce has been planted with much success in many of the Northern States, and is expected to thrive in Virginia, at least in fairly cool and moist situations. It also grows rapidly and in dense stands, producing useful wood.

The number of trees which are expected to be available for use this fall and next spring is as follows: white pine, trans-

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SALE OF TIMBER, KLAMATH INDIAN RESERVATION, CLIFF BOUNDARY UNIT.

SEALED BIDS, MARKED OUTSIDE "BID, Cliff Boundary Timber Unit" and addressed to the Superintendent of the Klamath Indian School, Klamath Agency, Oregon, will be received until 12 o'clock noon, Pacific time, Tuesday, September 23, 1919, for the purchase of timber upon about 10,000 acres within Townships 33 and 34 South, Ranges 7 and 8 East of the Willamette Meridian. The sale embraces approximately 100,000,000 feet of yellow pine and sugar pine. Each bid must state for each species the amount per 1,000 feet Scribner decimal C log scale that will be paid for all timber cut prior to April 1, 1921. Prices subsequent to that date are to be fixed by the Commissioner of Indian Affairs by three-year periods. No bid of less than three dollars and seventy-five cents (\$3.75) per 1,000 feet for yellow and sugar pine and one dollar (\$1.00) per 1,000 feet for other species of timber during the first period will be considered. Each bid must be submitted in duplicate and be accompanied by a certified check on a solvent national bank in favor of the Superintendent of the Klamath Indian School in the amount of \$10,000. The deposit will be returned if the bid is rejected but retained if the bid is accepted and the required contract and bond are not executed and presented for approval within sixty days from such acceptance. The right to reject any and all bids is reserved. For copies of the bid and contract forms and for other information application should be made to the Indian Superintendent, Klamath Agency, Oregon.

Washington, D. C., July 14, 1919. CATO SELLS, Commissioner of Indian Affairs.

FORESTER wanted as Division Firewarden in New Jersey. Must have professional training and some experience. Salary \$100 to \$120. Eligible for promotion to Assistant Forester. Civil Service examination can be taken after provisional appointment or by mail. Box 810, care American Forestry Magazine, Washington, D. C.

plants, 17,000; shortleaf pine, transplants, 13,000, and seedlings, 1,400; loblolly pine, transplants, 8,000, and seedlings, 7,500; and Norway spruce, transplants, 1,000.

Rules for the disposal of these plants will probably provide for distribution to public institutions free of charge, and to land-owners in Virginia at a cost low enough to encourage reforestation and based on the cost of raising them. Trees of the species and sizes desirable for forest planting are not grown by any commercial nursery in Virginia, and it is expected that the example of the State will result in such nurseries putting such material on the market after the market has been developed by the State.

The State Forest Nursery is located at Charlottesville, Virginia, a junction point of the Southern and Chesapeake and Ohio Railroads, on ground belonging to the University of Virginia and placed at the disposal of the State Forester free of charge for this purpose.

TEXAS

MR. ALFRED MACDONALD, a graduate of the Harvard Forest School, has been appointed City Forester for the City of Dallas. City forestry is new in Texas, Dallas being the only municipality boasting of such work. Many other Texas cities have beautiful trees and splendid possibilities and it is to be expected that they will follow the lead set by Dallas when the benefits of such work are appreciated.

A resolution was recently passed by the State Legislature advocating the planting of pecan trees along state and county highways. The pecan is the official State tree and although it is not suited to conditions in all parts of Texas, yet there are many



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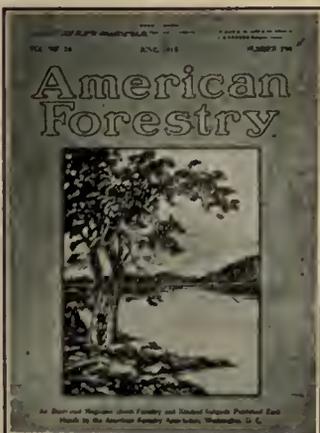
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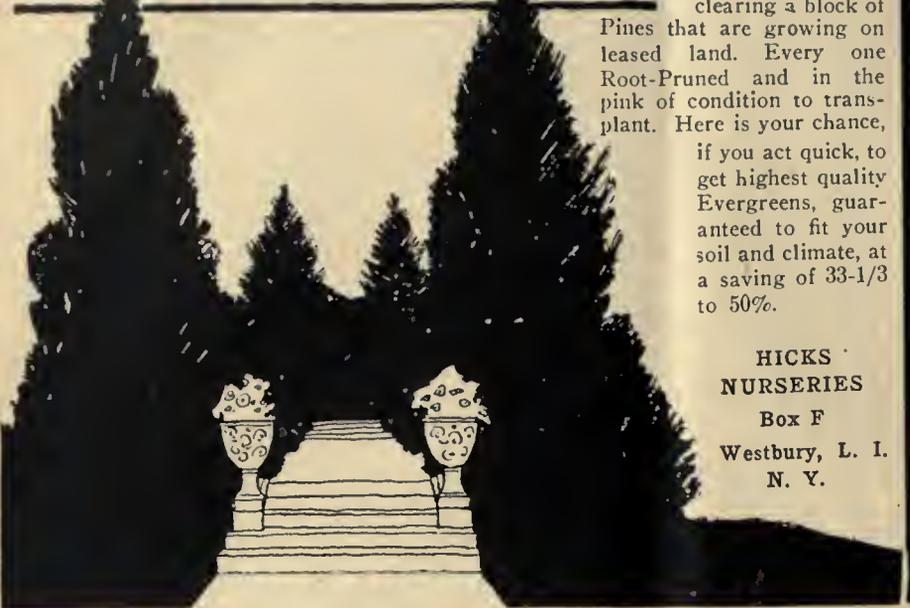
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miles of highway which could be beautified by planting these sturdy, graceful utility trees.

WISCONSIN

TO put its discoveries into practical use as soon as possible, the Forest Products Laboratory, Madison, Wisconsin, has adopted the plan of sending out at short intervals a sheaf of so-called "Technical Notes." These notes are not too technical, however, for the average wood worker. They are simply practical suggestions backed up by many tests, on such subjects as how to build boxes and crates, make waterproof glue joints, prevent decay in wood, tell commercial woods apart, or keep doors from shrinking and swelling. The notes are distributed in quantity to the wood-using associations, to technical schools and colleges, and upon request to all others who might benefit by them.

A knowledge of the properties of wood is as essential for aircraft repair men as for aircraft builders. The new school for airplane mechanics at the Great Lakes Naval Training Station will give Navy aircraft repair men a thorough training in the selection and treatment of airplane woods. Instructors in this school have been detailed for some time to the Forest Products Laboratory at Madison, Wisconsin, to collect information for use in their courses. The laboratory is also furnishing the school material for a text book on wood identification, inspection, conditioning and testing.

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

THE Canadian Forestry Association is just sending on the road, for the second season its "Forestry Car." This is a special car fitted with all sorts of fire fighting apparatus, a miniature nursery, samples and pictures of wood manufactures, moving picture apparatus and lectures. This car is sent to regions which have large timberlands or industries and also stops for lectures in the larger cities. Audiences of 600 at one meeting are not uncommon. This kind of propaganda has proved most effective, especially in districts which have been foci of forest fires in the past. Mr. Black, the Secretary, is to be congratulated on his cleverness in devising novel propaganda methods in the efficient way in which he has carried them out.

Sales of timberlands in Ontario, recently made by the Government have realized the highest prices ever paid, in one case \$22.00 per thousand feet, standing.

The Government of New Brunswick has again advanced the dues on timber cut on Crown Lands by one-third and has put into force new cutting regulations. This will mean an increase in revenue of \$150,000 if the cut is the same as last year. Spruce, pine, tamarack and cedar will pay \$3.50 per thousand instead of \$2.50; hemlock, fir and poplar \$3.00 instead of \$2.00. Spruce and white pine shall be cut not less than 12 inches in diameter measured inside the bark not less than 12 inches from the ground. Jack pine, or "Princess Pine" as it is called locally, not less than 10 inches. Fir not less than 9 inches. A fine of \$50.00 per tree in addition to the regular stumpage is imposed. Trees must be utilized to a six inch top and a penalty of \$7.50 per thousand will be imposed for all usable material left in the wood in contravention of the regulations. In case of fire or blow down the Government may compel the licensee to cut and remove such timber before it becomes unusable. If he does not remove such timber he must pay the stumpage in any case. Trees killed by fire or budworm shall only pay two-thirds the stumpage of sound trees. New Brunswick is advancing rapidly along forestry lines and should be heartily congratulated.

The Brown Corporation has bought a hydroplane for mapping their timber lands and has decided to undertake planting operations on their holdings in the United States, planting four trees for every one they cut. They are undertaking this as a patriotic duty. We hope there will be more like them, and venture the statement that

after fifteen or twenty years they will be very thankful that they were so patriotic and far sighted.

In traveling through southern Quebec and northern Maine much damage to balsam and spruce by budworm was noticed.

Plantations of Scotch Pine in Quebec are showing damage from white pine weevil, from a fungous disease and from a rust. Several trees are showing this years shoots falling off and it looks as if the damage is due to mice. Altogether this species does not seem to be a good one to plant.

Norway spruce plantations are doing remarkably well, growth this year being in many cases from two to three feet. Plantations made in 1914, four year old stock, are now six feet and over on fair soils.

Fires in the Prairie Provinces have been disastrous this summer and have been very difficult to control. Northern Ontario has also suffered quite a little.

Arrangements are being made by Dr. Howe of the Commission of Conservation with a number of the large paper and lumber companies to have certain areas cut this next winter under regulations drawn up by him and under the supervision of his men. This will mean some additional slight cost of logging but will furnish very important information in regard to the effect of different systems of cutting. Such co-operation is very valuable and should be encouraged and as widespread as possible.

AIRPLANES FIND FOREST FIRES

REPORTS to the Forest Service, United States Department of Agriculture, from the national forests in California, where Army aviators are making daily flights in search of forest fires, indicate that the innovation has been decidedly successful and that air patrols of the forests will prove so valuable that they will eventually become a permanent part of the work to shield the great woodlands from conflagrations. Numerous fires have been discovered in their early stages by the aviators and, have been reported immediately to the forest rangers. It is believed that considerable loss has been prevented by such early discovery. Lack of suitable landing places in this rugged country has proved a handicap in some instances and has caused a belief in certain quarters that dirigible balloons will finally be found more suitable than airplanes for forest flying.



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Pennsylvania State College

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FOREST SCHOOL NOTES

UNIVERSITY OF CALIFORNIA

OF the three faculty members who were in the army, Major David T. Mason was the first to return. After being with the school for two months, he was borrowed for the rest of this year by the Treasury Department and will be in Washington until January 1st as timber expert.

Captain Donald Bruce returned to take up his work in Forest Engineering on June 1st after 21 months service in France. While with the A. E. F. he was engaged in securing from the French the timber which was later cut by the 10th and 20th Engineers.

Captain Emanuel Fritz took up his duties as Assistant Professor of Forestry, in charge of the work in forest products on July 1st, after nearly two years in military service.

Professor Walter Mulford, head of the Forestry School, has been given added administrative duties and responsibilities in the recent reorganization of the College of Agriculture. He is now Director of Resident Instruction and chairman of the administrative committee, in which capacity he will have direct supervision of the entire student body of the College of Agriculture. In spite of this added work he plans to give his usual forestry courses next spring.

Dr. Charles H. Shattuck, who was with the school as professor of Forestry from August 1917, until January of this year, has gone into private work with his brother at Idaho Falls, Idaho.

Professor Woodbridge Metcalf has just returned from a trip to the southern part of the state in connection with his study of eucalyptus plantations and the supervision of the Santa Monica Forestry station. He spent a few days with Supervisor Tillotson of the Cleveland National Forest on an inspection trip in the San Jacinto Mountains.

Charles E. Van Riper (20) has brought his bride with him from France and intends to complete his college course.

A. E. Wieslander (15) was married in June to Miss Mabel Holmes of Berkeley. He has taken his bride to the Lassen National Forest where he is engaged as Forest Assistant.

Myron E. Kruger (16) stopped in for a visit on his way from France to Linton, Oregon where he has accepted a position with a large lumber company.

Alex. Muzzall (16) paid a visit on his way to Sumatra where he has gone to manage some of the Goodyear Rubber Company plantations.

Lieutenant Ansel Hall (17) has just re-

turned from some very interesting work under Colonel Greeley in France and is returning to his work with the National Park Service. He has been assigned to a district in the Yosemite National Park.

C. O. Gerhardy (20), G. W. Byrne (22) and J. E. Pemberton (22) are getting some logging experience with the Hammond Lumber Company, Eureka, California.

R. C. Burton (14) is with a reconnaissance party on the Lassen National Forest this summer but will return to his work at the Santa Cruz High School in the fall. He is giving the only High School forestry course in California.

R. W. Beeson (20) is at Ephraim, Utah, at the Great Basin Experiment Station for the summer, working on grazing reconnaissance.

COLORADO AGRICULTURAL COLLEGE

DURING March, 1919, some 25 or more soldiers who had suffered wounds or gassing or had developed incipient tuberculosis were sent to the Colorado Agricultural College by the War Department to be given instruction along lines decided upon by Government advisors and the vocational soldier students in order that recuperation could be effected at the same time that training useful for later life could be given. Undoubtedly giving them something to do actually accelerates their physical improvement.

One young marine who had worked in citrus groves in Louisiana before the war is studying horticulture and, in the Department of Forestry, is studying, as a minor subject tree repair work with the view of repairing fruit trees, using the methods employed by "tree surgeons."

Another Marine who was gassed at Chateau Thierry is fitting himself to be a forest ranger.

Others are pursuing agricultural or mechanical subjects.

Almost without exception these soldiers display much enthusiasm in their studies and make good progress in spite of deficient early schooling in some cases. Accustomed as they are to discipline, they make ideal members of the student body.

The amount of work assigned to each is determined by his physical condition, since his health improvement is given first consideration.

IOWA STATE COLLEGE

THE Forestry Class of the Iowa State College has just completed a months camp on the Arapaho National Forest in Colorado. The men have been engaged in various Forest service operations, such as timber marking, scaling, logging and lum-

bering which has enabled them to gain experience along the practical lines of forestry. The camp was established in the lodgepole — Englemann Spruce country, where there are extensive lumbering operations which enabled the students to secure good experience along the utilization end of forestry. The class returned to Ames the first of September to continue the forestry work.

INDIANA

LIEUTENANT T. I. Taylor, who recently returned from one year's service with the aviation force overseas, is now practicing City Forestry at Evansville, Indiana. Mr. Taylor was graduated from the Forestry Department of Purdue University with the class of nineteen seventeen, leaving the University early for training in the Aviation Service. While in France, Lieut. Taylor had an exceptional opportunity of visiting many of the French State Forests.

Private Troy Fox, who returned from France in July after nearly two years' service with the Twentieth Engineers, has taken a position with the Forest Service in District 1. Private Fox reports some very interesting experiences in the forests of France, but much prefers the United States to the Landes.

Prof. Burr N. Prentice, who is in charge of the Department of Forestry at Purdue University is in the Northwest this summer in the employ of the Office of White Pine Blister Rust Control in the Bureau of Plant Industry. Co-operative work is being carried on in the five needle pine States of the west, to prevent the extension of the blister rust scourge into western territory.

The prospects are bright for a record registration in the Department of Forestry at Purdue University. Practically all upper class students will return, and elementary courses are going to be crowded.

MICHIGAN

THE Forestry Department of the Michigan Agricultural College is planning on collecting seed this fall from a white pine windbreak at the college. Two years ago 110 pounds of seed were obtained from this windbreak, which is half a mile long and consists of a double row of trees, spaced about 10 feet apart. The trees are 22 years old and have been bearing seed for some time. This was the first attempt that had been made, however, to collect the seed. The seed was collected by boys climbing the trees and cutting off the cones with a sharp blade on the end of a six-foot stick. The department has called the attention of farmers to the fact that at present prices there might be considerable money in collecting seed from windbreaks or even from individual trees of certain species.

During the spring term 106 freshmen took the course in farm forestry at the Michigan Agricultural College. This course is required of all students in the agricultural course. It covers the care and management of farm woodlands, planting, utilization of timber, basket willows, maple sugar making and other activities connected with the woodlot or better utilization of waste lands.

Through the courtesy of the Barrett Company the Michigan Agricultural College has obtained the use of a portable post treating plant, consisting of a tank, firebox and accessories. This plant will be loaned to farmers without charge other than transportation. Many farmers who have only a few posts to treat do not feel justified in getting special equipment, or do not understand the correct methods to use. The Forestry Department of the College plans to give demonstrations in various parts of the State.

Mr. E. C. Mandenberg, the Forestry Extension specialist of the college, has returned after a year's absence on war work. The Michigan Agricultural College was the first agricultural college to employ a man full time for such work. The college has had a forestry extension man for the last six years.

During the past spring the college shipped 180,000 trees from the forest nursery for planting in the State. Since 1909 over 2,100,000 trees have been shipped from the nursery. This is enough to plant an area of 2,000 acres. During the war but very few trees were sold, but the nursery is now getting back to its normal output. The trees used are largely transplants about 10 inches high.

IDAHO

THE School of Forestry, University of Idaho, at the request of the state board of land commissioners, has made a reconnaissance study of the state lands at Big Payette Lake for the purpose of working out a plan for the development of the timber resources of the tract and the recreational facilities of the water front. As a basis for recommendations to the state land board, the University party is making a topographic map of the tract and an estimate of the timber.

The state lands adjacent to the lake comprise some thirteen thousand acres, and the timber on about twenty-five hundred acres was sold last March. The contract under which the sale was made provides that the trees to be cut shall be marked or otherwise designated by the state agent in charge, that the timber left shall be protected from damage in logging operations, that the stumps shall be of a certain height, and that the brush shall be piled and burned or otherwise disposed of to the satisfaction of the state agent. Frank G. Miller, Dean of the School of Forestry, has been designated by the land board as state agent and

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Orono, Maine

placed in charge of the logging operations for the state.

The plan of cutting adopted is intended to preserve to the utmost the scenic value of the lake slopes. For the most part, the timber immediately along the lake shores will be left intact, a salvage cutting only being made here.

The terms of this contract constitute an important innovation in the management of timber sales on state lands in Idaho, and are attracting wide attention.

Dr. Henry Schmitz, of Washington University, at St. Louis, has just been called to the faculty of the School of Forestry. He graduated with honors from the School of Forestry, University of Washington, Seattle, in 1915. In September, 1916 he was appointed a fellow in the Shaw School of Botany of Washington University, St. Louis, from which he graduated in June, 1919 with the degree of Doctor of Philosophy, writing his thesis on the "Relation of Bacteria to the Decay of Wood." From July, 1917 to January, 1919, Mr. Schmitz was in the U. S. Naval Reserve Force where he served with distinction. He has had practical experience in the forests of the Northwest with both the U. S. Forest Service and private concerns. Dr. Schmitz comes to the School of Forestry with the best endorsements from those who know his work. Dr. G. T. Moore, director of the Missouri Botanical Garden, says of him, "As an investigator he has shown himself capable of conducting high grade work independently, and there is no reason why he should not make a distinct mark for himself because of his ability in research."

I. W. Cook, associate professor of forestry was with the Rose Lake Lumber company during the summer, engaged on stumping appraisal work.

NEW YORK STATE COLLEGE OF FORESTRY

"TAKE the Returning Soldiers Back," is the policy of the New York College of Forestry at Syracuse, at the head of which is Dean Hugh P. Baker, who won a commission as captain of infantry. Five returning soldiers have been given positions in the faculty of the college. All are men who were formerly with the college, and the appointments are as follows: Russell T. Gheen, formerly with the extension department, later with the Southern Pine Association, captain in field artillery, returning to the extension department for special work in New York state, particularly for lecture work.

Reuben T. Pritchard, assistant professor of silviculture, first lieutenant with Battery F, 345th Field Artillery, of Texas; George H. Cless, Jr., formerly of the extension department, later with the National Lumber Manufacturers association in charge of exhibits, first lieutenant with trench mortar

battery in Italy, and in charge of a military commission to investigate food supplies in Hungary and Serbia after the armistice; Oliver M. Porter, Captain Quartermaster Corps, with troops in Europe, former faculty member; Allan F. Arnold, formerly with the extension department, who returns as sergeant, but with a special citation for bravery in action.

New Professor of Forest Extension

Warren B. Bullock, former Milwaukee newspaper correspondent and magazine writer, has been made professor of forest extension at the New York State College of Forestry, Syracuse, New York, marking what appears to be a new campaign of advocacy of forest development. Mr. Bullock has been in newspaper work in Milwaukee nearly 20 years, as reporter, editor and head of the news bureau bearing his name. He became interested in forestry while publicity manager of the National Lumber Manufacturers' Association.

The selection of Mr. Bullock for the eastern work evidently is a part of Dean Baker's plan to go to the people of the State with his advocacy of modern forestry methods.

PENNSYLVANIA STATE COLLEGE OF FORESTRY

THE Freshmen Forestry Camp of the Pennsylvania State College, was held on a 1400 acre tract of young timber near Lamar, Pennsylvania, which is about 30 miles from the College. This is the permanent camp site for Freshmen.

The Sophomore Camp was with the Central Pennsylvania Lumber Company at Laquin, Pennsylvania. The lumber mills at Laquin and Masten were studied and the logging operations at Hillsboro. Side trips were taken to study the many wood-using industries in the region.

Professor George R. Green, who has been in charge of the section of wood technology at the Naval Aircraft Factory, Philadelphia, returned to State College during July to give the work in Forestry and Tree Identification in the Summer Session of the College for teachers.

Lieutenant W. G. Edwards, Assistant Professor of Forestry, has returned from France where he was with the 10th Forestry Regiment and later with the 20th Regiment. He will have charge of the courses in lumbering.

The Forestry Department has recently been placed in charge of the 200 acres of woodlands on the college farms which cover 1500 acres of land.

An arboretum will be started in the fall which will include all the woody vegetation indigenous to the state of Pennsylvania.

PENNSYLVANIA STATE FOREST ACADEMY

ON August 13 three seniors completed their 144 weeks' course at Mont Alto. Four other seniors will return in September and work until January 1 to cover work missed while in the Army or Navy. In all seven men will complete work for their B. F. in 1919.

Four other service men will return to school this fall, entering the second and third year classes. All service men will then have returned to school, except two who have received permanent Lieutenances in the regular army.

On September 2, with the beginning of the new school year, 33 men were enrolled at the school. The faculty consists of: Prof. E. A. Ziegler, A. M., Forestry and Surveying; Prof. W. M. Drake, M. S. F., Forestry; Prof. George S. Perry, B. F., Forestry; Prof. C. J. Harris, M. S., Biology; Prof. Eugene P. Deatrick, Ph. D., Chemistry and Soils.

The Legislature adjourning in June granted an increased appropriation for 1919-20.

The chestnut blight is at the height of its attack and the school forest is losing in excess of 100,000 cords of its growing stock on its 23,000 acres. Forester Staley will salvage probably 20 per cent of this through sale of tie stumps, sale of poles, extract wood and some lumber taken out by forest employes. The students have here an excellent study of the utilization of second growth hardwoods which will be the principal product of the young state forests for a considerable period. The gross income for 1919 will be about \$12,000.

Prof. J. S. Illick has severed his connection with the Forest Academy and is now Chief of Division of Silviculture of the Department of Forestry with his office at Harrisburg.

With deep regret the school announces the loss of Andrew L. AuWerter, Class of 1919, the only undergraduate to fall in action in France. He had enlisted in the Marines and fell in the fighting in the Argonne shortly before the armistice.

FOREST FIRES DETECTED BY AIR SERVICE

THE importance of the army Air Service at this time when disastrous forest fires are raging in Montana, Idaho, Washington and Oregon, not now under aerial fire protection, is indicated in California where the Air Service has been the means of detecting many fires which have been quickly extinguished.

During the week ended July 19 flying officers of the March, Alessandro and Rockwell fields made a total of 65 flights covering 7,707 miles in a little more than 100 hours and discovered ten fires. For the

four weeks ended July 19, 259 flights were made and 27 fires discovered.

The balloon division is doing superior work from its Ross field, Arcadia station, and so intense is the interest in the work that the commanding officers are participating personally in observations.

WIRELESS PHONE IN FOREST WORK

THE Forest Service wireless telephone has been successfully tried out in Portland. As a result instruments will be installed on Mount Hood for use in case of forest fires. One station will be at the summit of the 11,000-foot snow clad peak and the other at the Zigzag ranger station.

The test which was made recently by C. M. Allen, telephone engineer of the Forest Service at a distance of eight miles was eminently successful.

BOUQUETS

"Permit me to add my measure of praise concerning the improvements in American Forestry. Not only is it a pleasure to look at but the contents are interesting to everyone who loves the out-of-doors." F. F. Moon, Santa Barbara, California.

"My advertisement in your July issue has been entirely satisfactory, and from the various answers received I have made a satisfactory selection." Frederick Osborn, New York City.

"The magazine is, in my opinion, both a typographical and artistic gem, in the special field of its usefulness."—Mrs. Rufus Choate.

You have such splendid articles and illustrations in American Forestry—it always seems a clear echo of a delightful tramp."—Julia A. Thorns.

"I have taken American Forestry for several years, and have found it more and more useful and instructive."—Homer I. Ostrom.

"I appreciate the information American Forestry brings me each month."—W. A. Wells.

"I am greatly interested in your work and regard your publication as both valuable and fascinating."—Charles Nagel.

"I certainly enjoy the articles in American Forestry by Dr. Shufeldt and also the ornithological articles by Dr. Allen."—Wm. E. Menzel.

"It is very gratifying to find that American Forestry is attracting so much attention. I certainly think that the special June number was a great credit, and the July issue was also extremely interesting."—Chester W. Lyman, New York City.

"I read, with great interest, the magazine of the Association and certainly think it is a 'dandy.' I look forward to its arrival each month and would not miss it for anything."

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By John J. Ingalls

Late Senator of Kansas

"GRASS is the forgiveness of Nature—her constant benediction. Fields trampled with battle, saturated with blood, torn with the ruts of cannon, grow green again with grass, and carnage is forgotten. Streets abandoned by traffic become grass-grown like rural lanes, and are obliterated; forests decay, harvests perish, flowers vanish, but grass is immortal. Beleagured by the sullen hosts of winter, it withdraws into the impregnable fortress of its subterranean vitality and emerges upon the solicitation of Spring. Sown by the winds, by wandering birds, propagated by the subtle horticulture of the elements, which are its ministers and servants, it softens the rude outline of the world. Its tenacious fibers hold the earth in its place, and prevent its soluble components from washing into the sea. It invades the solitude of deserts, climbs the inaccessible slopes and forbidding pinnacles of mountains, modifies climates and determines the history, character and destiny of nations. Unobtrusive and patient, it has immortal vigor and aggression. Banished from the thoroughfare or the field, it bides its time to return, and when vigilance is relaxed, or the dynasty has perished, it silently resumes its throne, from which it has been expelled but which it never abdicates. It bears no blazonry of bloom to charm the senses with fragrance or splendor, but its homely hue is more enchanting than the lily or the rose. It yields no fruit in earth or air, and yet should its harvest fail for a single year famine would depopulate the world."

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AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

OCTOBER, 1919 Vol. 25

No. 310

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NOTICE TO OUR READERS

As this magazine goes to press announcement is made of a severe fire in the offices of the American Forestry Association in which many of the valuable records, papers and all back issues of the magazine, etc., have been totally destroyed. It will be necessary to ask that any letters of inquiry or other correspondence addressed to the Association within the last ten days be repeated. Delays in the conduct of the current business of the Association and the issuance of the magazine, AMERICAN FORESTRY, must necessarily follow, and indulgence and leniency is asked of our members.

P. S. RIDSDALE.

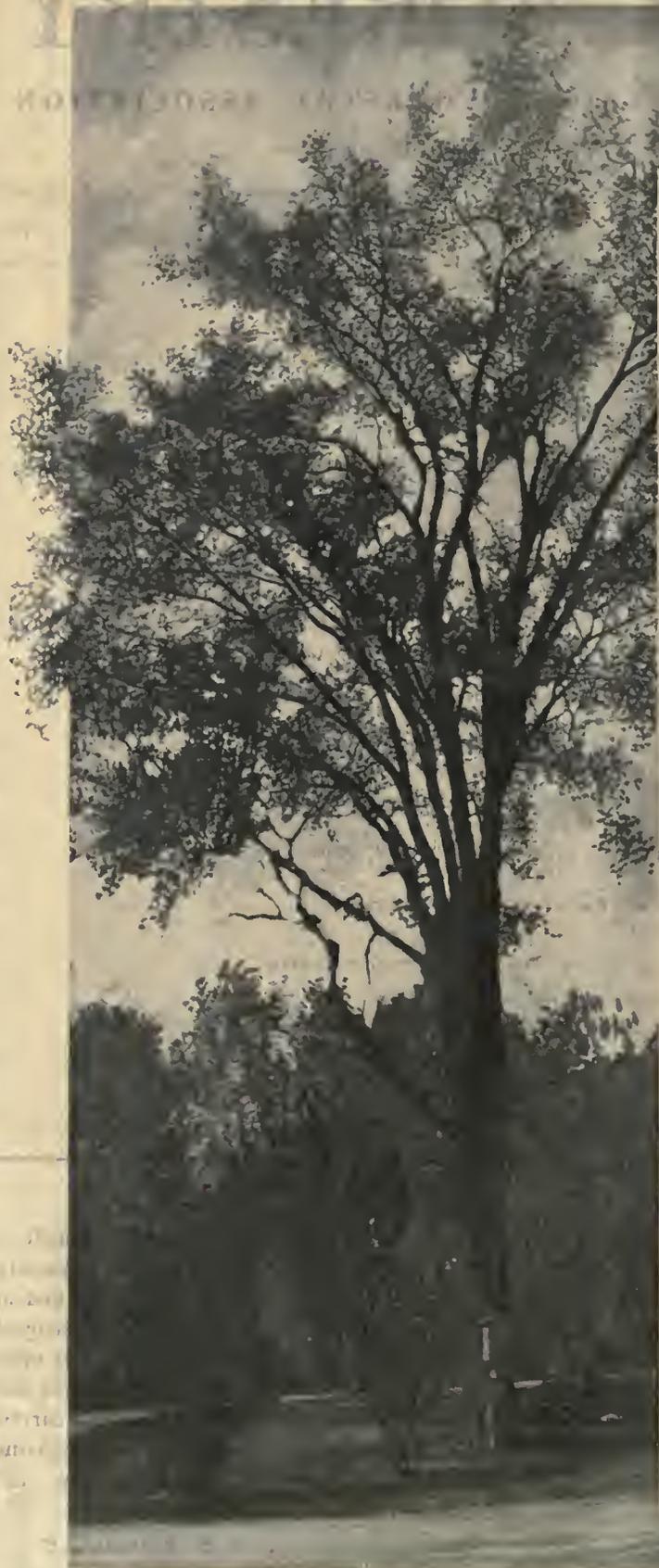
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LLAO ROCK

The famous sentinel in Crater Lake, National Park.



TO THE BANKERS OF AMERICA



“Roads of Remembrance”

IT is the suggestion of the American Forestry Association, made the day following the signing of the armistice, that trees be planted in honor of America's soldiers and sailors, both as memorials to the dead and as tributes of appreciation to the living for their offer of service.

The Memorial Tree planting idea strikes a patriotic chord which should receive the support of the Bankers of America. For it is but the beginning of a great forward-sweeping desire and determination on the part of the people of America to see their cities and parks and local, as well as transcontinental, highways beautified with handsome trees and their forest resources enriched through a deepening and broadening of conservation methods and reforestation.

In connection with the movement, there is a plan proposed which would provide for a county unit system placing memorial tablets to the men who gave their lives for their country, the tablets to be placed on the county courthouse or on memorial highways extending from county to county, preferably at the points where these roads enter adjoining counties.

Cities large and small throughout the nation are showing their approval of “Tribute Trees.” In our parks and along our highways they will serve as a living tribute to American heroism. They will mark our “Roads of Remembrance.”

THIS TITLE PAGE FROM THE BURROUGHS CLEARING HOUSE, A PUBLICATION FOR BANKERS, IS AN EXAMPLE OF THE FINE CO-OPERATION THAT IS BEING GIVEN THE CAMPAIGN OF THE AMERICAN FORESTRY ASSOCIATION FOR MEMORIAL TREE PLANTING AND ROADS OF REMEMBRANCE. HERE IS A PUBLICATION DEVOTED TO BEST BUSINESS METHODS YET ITS EDITOR IS QUICK TO SEE THE OPPORTUNITY IN MEMORIAL TREE PLANTING FOR BETTER ROADS WHICH MEAN BETTER BUSINESS AND A BETTER COUNTRY.

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THE FOREST POLICY OF FRANCE--ITS VINDICATION

BY W. B. GREELEY, LIEUT.-COL. ENGINEERS

"FRANCE will perish for want of wood," exclaimed Colbert in 1669. The fears of this far-sighted Minister of old France, which led to a revision of forestry laws that has profoundly influenced all subsequent legislation, might indeed have been realized in this great war. Wood was one of the most vital military necessities; and France had to supply from her own forests not alone the needs of her own vast armies for four and a half years but also the larger part by far of the

element of national strength in the greatest crisis of her history.

The development of this policy has not been smooth and uninterrupted. It has suffered setbacks. It has reflected the social and political upheavals of the last two centuries. It has been influenced by changes in economic conditions and emphasis. Certain chapters in its history bear a striking resemblance to the disposal of public timberlands in the United States. As a whole, it



A TRAINLOAD OF LARGE HARDWOOD LOGS CUT FROM ONE OF THE ROTHSCHILD ESTATES BY THE 20th ENGINEERS

timber used by the British, Belgian, and American forces. The American operations alone required 450,000,000 feet of timber and 650,000 cords of fuelwood, and less than one per cent of this enormous quantity was brought from the United States. For the abundant supplies of timber directly available to the battle lines, the Allied world must thank the patience and foresight with which the French nation has built up its forest resources. Apart from its value to her peace-time life and industries, the forest policy of France has been vindicated as a capital

is a fruitful field of study for the American forester and economist. Particularly at the present time, when the war has brought home to us the weakness and danger of our own indifference toward the forest resources of the United States, is it opportune to take note how similar problems have been worked out in France. I hope, in subsequent articles, to describe a few of the more important features of French forest policy, the "regime forestier"—its backbone, private forestry in France, and the fight against sand dunes and mountain torrents. I shall

try now to give a picture of French forestry in the broad,—its historical setting, the national conceptions which it expresses, and what it has accomplished.*

The forestry ordinances of the "ancien regime" contained a mass of detailed restrictions, designed not only to prevent a diminution in the forested areas but also to control the methods of cutting and using timber. Hardwood sprout forests could not be cut before the age of ten years; and then a certain number had to be reserved to produce large timber. The age when large trees might be cut and methods of securing regrowth were carefully defined. The needs of the royal navy were protected by requiring special sanction from the king before large timber could be cut within 10 leagues of the sea or 2 leagues of a navigable river—a regulation which calls to mind that the first forestry legislation of the United States was the reservation of oak and cypress lands for the supply of the American navy.

This forestry code was in keeping with the whole rural legislation of the times. The freedom of land owners was restricted at almost every turn by royal decrees. Vineyards could not be planted in certain cantons. The fallowing of land at stated periods was obligatory in nearly all forms of culture. It is significant that the public interest was but a secondary and incidental object of these onerous restrictions. The king regarded himself as the guardian of his people; and sought to

*Much of the material for these articles has been taken from Guyot's Cours de Droit Forestier.

protect his subjects against injuries to their own interests.

The great outburst of democracy and individualism in the French Revolution unceremoniously threw this maze of restrictive legislation out of doors. The free citizen of the new era was released from all guardianships. A law of 1791 declared that the forests of private owners ceased to be under control of the State. Their owners were free to cut or destroy as they saw fit. During the succeeding half century a large number of private forests were wiped out. Even after public control of the denudation of private woodlands was restored, its application was extremely lenient for many years. Authorizations to destroy 489,000 hectares (1,222,500 acres) were granted subsequent to 1828, no records prior to that date being available. The demand for cereals, particularly in northern France, had much to do with the large aggregate decrease in the forested area of the country, for many of the French forests in the plains occupied land similar in character to that under cultivation. In southern France and in her mountains, the predominance of pastoral industries led to a gradual diminution in the area of woodland from excessive grazing.

Modern French writers are agreed that this suddenly gained liberty of the Revolution was abused; that the transition from the restrictive guardianship of the sovereign to the new regime of "laissez faire" was too rapid and the land owners too inadequately prepared to use their freedom. But the movement as a whole was an inevitable and necessary part of the change from the old



AN AMERICAN SAWMILL AMONG SAND DUNES WHICH WERE BARREN WASTES 75 YEARS AGO



ANOTHER OF THE SAWMILLS OF THE 20th ENGINEERS IN THE VOSGES MOUNTAINS

political and economic order to the new. It extended indeed to the state forests, sequestered properties of the crown and nobility. Particularly during the period from 1814 to the end of the second Empire, a large number of state forests were alienated under the theory that it was wise to convert this public property into cash and that the land would best contribute to the economic welfare of the country under private ownership and use. These alienations carried no restrictions as to cutting or denudation and in the case of most of them reforestation was left to chance.

The most interesting feature of this history is not the extent of the reaction but the rapidity and effectiveness with which French common sense and French conservative instinct toward natural resources reasserted themselves under the very freedom of democratic institutions. As early as 1803, a law restored public control of the extent to which privately owned forests might be destroyed. And in 1827 was adopted the "code forestier" which, with minor modifications, has remained to the present day as the corner stone of French forest policy. The forestry code aimed primarily to establish the basis for administering and perpetuating the forests in all forms of public ownership. But the conceptions underlying it are of special interest as illustrating the attitude of the French toward their forest resources as a whole—private as well as public; an attitude which finds expression in practically all the subsequent legislation.

The French conceive of their forests as standing apart from other forms of real property because of (1) their peculiar nature from the standpoint of principal and interest and (2) their public utility. The trees compos-

ing a forest at any given time represent its capital, or growing stock, together with certain quantities of wood which have been produced by that capital and comprise its expendable revenue, which will be realized from time to time by cutting. Revenue and capital are thus intermingled; both are readily convertible into money; and the danger of reducing the forest capital of the country by unwise or ill-timed lumbering is always present. Furthermore, a forest once ruined by abuse restores itself slowly. While a few years can efface the effects of poor farming, a century may be required to restore a forest capital reduced or destroyed by imprudent cutting. On the other hand, their public utility demands that the forests of the country be extended rather than reduced. Forests figure largely in the public policies of France because the French know that, aside from their direct economic value, forests hold the soil on mountain slopes, prevent erosion, stop the devastation of shifting sand, preserve the sources of their rivers and their marvelous inland waterways, and maintain the atmospheric humidity necessary for the cultivation of the valleys. Hence the necessity of special and restrictive legislation, going far beyond the terms of the common law, even beyond the provisions of the penal code, to preserve the integrity of French forests, public and private alike.

This conception is well expressed in Guyot's discussion of the laws against the destruction of privately owned forests.* "This legislation constitutes a remarkable anomaly in our civil law concerning the legal obligations imposed on private property. In principle, the private owner is free to use and enjoy his property, free

*Cours de Droit Forestier, Livre V., Par. 1659

also to dispose of it and to change it as he pleases. The prohibition of denudation applies to but one class of landed property, the forest. An agricultural proprietor can transform his property, make a meadow of a cultivated field, a pasture of a vineyard; but such changes are forbidden to the forest owner. He must preserve his property in a forested condition even when he might profit by a change. This lucrative operation is forbidden him in the public interest. He might, indeed, be indemnified for the heavy burden which is imposed upon him. But he can seek no compensation, no remittance of taxes, no special favor.

"How shall we justify an intervention of the state so exceptional, a limitation so extraordinary upon the rights of every private owner? It can be explained only by the special nature of forested property. It is this character peculiar to itself which has prompted the enforcement of a forestry regime upon public owners like the

of administering forests owned by the state, the communes, and by public institutions, based upon continuous production and the cutting of no more than the current growth. It contains its own, distinctive, and complete penal system for the protection of these properties. Its penal code is almost taken bodily from that existing under the "ancien regime" and differs profoundly from the modern penal laws of France. Its basis is the fine, imposed in accordance with fixed and arbitrary schedules, which are obligatory upon the courts and leave the judge no discretion to consider mitigating circumstances. These penalties are set forth in minute detail, even to the imposition of heavier fines in cases where trees are cut at night or with a saw because such trespasses are more difficult to detect. The forest officers themselves exercise many judicial functions in the punishment of trespasses. They may even enter that stronghold of French individual liberty, the home, without



MULE TEAM BRINGING MARITIME PINE LOGS TO A MILL IN SOUTHWESTERN FRANCE

communes. The forest once destroyed is so slow to reestablish itself that future generations must be guaranteed against abuses by the present generation. If the country needs wheat, nothing is easier than to increase the culture of cereals from one year to another; but if the need be for wood, the creation of new forests will require long years during which the public interests will suffer gravely."

The most striking examples of this solicitude for the preservation of their forests are found in the French code for the administration of publicly owned forests and the laws restricting the denudation of woodlands in private ownership. In each appear significant exceptions to the general principles which the individualistic and liberty-loving French have incorporated in their legislation since the revolutionary period. The "code forestier" not only defines in precise terms the methods

warrant, in search of evidence that offenses have been committed.

The laws concerning private forests impose no prescribed methods of cutting other than the obligation resting upon every owner not to destroy his forest without prior warrant from the state. Such warrants may be issued by the Minister of Agriculture upon a favorable report from the Conservateur of Waters and Forests, but may be refused on the ground that the proposed denudation would be injurious to the protection of mountain soils from erosion, to the protection of inland areas from shifting sand, to the sources of streams, or to the public health. It is to be noted that the right to destroy a forest can not be withheld on the grounds of the needs of the country for timber, although many attempts have been made to incorporate such a provision in the law. The teeth of the legislation concerning the denudation of

private forests are found in the severe fines which are imposed if the destruction of a forest actually takes place, without warrant, and in the discretion of the Minister to order the reforestation of the land by planting. If this is not done by the owner within three years, it may be done by the state at the owner's cost. It makes no difference whether the denudation was intentional or not. The penalties are applicable if a forest actually disappears as the result of severe cutting or grazing.

These restrictive measures constitute but one phase of the forest policy of France. Its constructive features are equally striking. Foremost among them in commanding the admiration of the forest engineers in the American Army stands the conquest of the sand dunes on

pine under a cover of brush or herbaceous plants. Their success led to the adoption in 1810 of a systematic plan for controlling the dunes by the French government. State forests were established in part of the territory; but much of the planting was done on communal and private lands, under the principle of the state's paying the costs and then retaining the use of the land for a sufficient period to recoup itself from the forests established.

The stabilization of the dune belt was actually accomplished in about sixty years, but the impetus given to the planting of maritime pine by private owners and communes has extended the forests of this valuable tree over almost the entire area of sand plains in southwestern France. The departments of the Landes and Gironde



Underwood and Underwood—British Official Photograph

GERMAN TRENCHES SMASHED UP BY BRITISH GUN FIRE IN THE BATTLE OF FLANDERS. THIS GIVES AN IDEA OF THE AMOUNT OF TIMBER USED IN FIELD FORTIFICATIONS

the southwestern coast and the conversion of the old bed of the Atlantic Ocean, formerly a thinly populated stretch of sand and marsh, into one of the most productive regions of France. Adjoining the South Atlantic Coast, is a belt of sand dunes covering some 350,000 acres. During the 18th century, the inland movement of these dunes, which traveled from 30 to 80 feet a year, buried entire villages and farms and threatened to destroy the economic life of the entire littoral. Experiments were begun by French engineers as early as 1784 in stabilizing the dunes by sowing the seed of maritime

contain today 1,500,000 acres of private forests, by far the greater part of which were established by planting. The forests of this region, created almost wholly by human foresight and patience, contained nearly a fourth of the timber of France at the outbreak of the war and were one of the most important sources of supply for the French, British and American Armies. The 20th Engineers cut ties and sawlogs from state forests in the dunes themselves which, sixty years previously, were not only wholly unproductive but a menace to the country. And aside from the production of timber, the afforestation of

the Landes has created the naval stores industry of southern France, drained its malarial marshes, enormously increased its population, and built up the productivity of its agricultural lands through the extensive cropping of forest undergrowth and litter for the fertilization of farms.

A similar struggle, not yet ended, has been waged with



BRUSH FROM FRENCH FORESTS USED IN REVETTING TRENCHES

the mountain torrents which have seriously eroded portions of the French Alps, with resulting floods and the destruction of agricultural lands in the valleys below. One of the worst effects of the sudden removal of restrictions upon the use of private lands, brought about by the Revolution, was the destruction of many forests in the high mountains and the excessive grazing of mountain pastures. Effective legislation to combat these perils was long held back by the difficulty of harmonizing the vigorous public action needed with French conceptions of individual liberty and initiative and by the conflict of interests between the pastoral folk of the mountains and the farmers of the plains. The terrible floods of 1859 prompted the enactment of a law for the reforestation of the mountains (July 28, 1860). It provided for the establishment of restoration areas within which reforestation and other measures would be undertaken by the state and by communes and private agencies with state aid. All forests within restoration areas, of whatever ownership, were placed under the administration of the Waters and Forests Service in conformity with the conservative requirements of the "regime forestier." Additional laws passed in 1864 and 1882 provided for the restoration of grass cover on denuded mountain lands under certain conditions and for various preventive measures in the mountain zone generally, particularly the regulation of grazing.

Some phases of this attempt to check torrential erosion in the mountains have not been successful, and the problem is a very live one in France today. The most effective steps yet taken have been the reforestation of lands owned by the state or communes and the purchase of mountain forests by the central government. This is

directly analogous to federal purchases of forests on the headwaters of navigable streams in the United States under the Weeks Law. While the French government has ample authority to add to its state forests, by purchase, in any part of the country, such acquisitions have, up to the present, been limited to mountain regions in connection with restoration projects. Many French foresters and economists advocate the extension of the public holdings in other sections, particularly in the oak forests of the plains where the timber of large size and high quality needed by industries like shipbuilding may not be grown by private owners.

Coupled with the laws restricting the freedom of the private owner in France to destroy his forest, is a series of constructive measures designed to promote the production of timber on private lands. Tax exemptions, in varying degrees, are extended to forest plantations during their first thirty years. The exemption is complete in the case of seeded or planted land on the slopes



BINDING FAGOTS OF BRUSH FOR USE AT THE FRONT

or summits of mountains, on sand dunes, and on land previously barren. If the planted land was under cultivation during the preceding decade, three fourths of the taxes are remitted. If the land has been fallow for ten years or more, it remains taxable but the assessed value of the bare land can not be increased for thirty years.

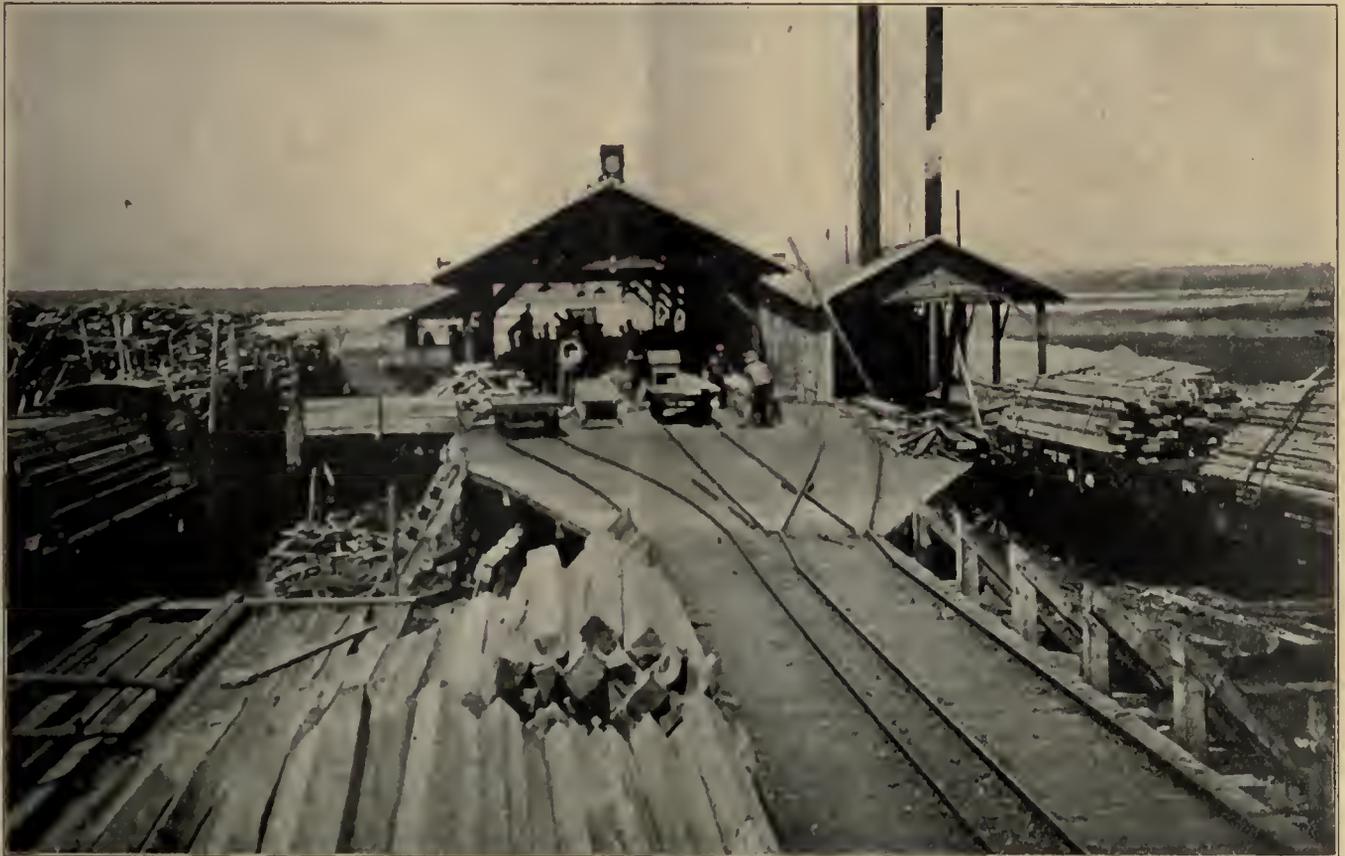
Other laws encourage the formation of local associations of forest owners for the joint administration of their properties. (The "syndicate" so common all over France for collective action in various enterprises). Such associations may extend from cooperative protection against fire or trespass to the complete management of timbered areas. And by a statute enacted in 1913 the services of the state foresters are offered to private owners or associations, at cost, in the protection or administration of their properties. Such measures, aiming to reduce the cost of technical management of timberlands, are especially adapted to the conditions in France, where timber values are high and forestry practice is general and well understood.

Private timberlands, in fact, comprise over two-thirds of the forest resources of France. 18.7 per cent of her

area is forested, or about 23,455,000 acres. The three million acres of state forests represent but 12 per cent of this total while another 20 per cent, owned by communes and other public agencies, is also under state administration. The rest is in private hands. The belief is common that the area of forests has been reduced below the minimum essential to sustained national prosperity and there is a strong demand in many quarters for extending the state forests, particularly in the mountain regions in connection with the checking of erosion and protection of water sources. But the results obtained by painstaking care in handling the limited resources of France are truly remarkable. Imagine a third of the population of the United States crowded into an area less than that of Texas and still supplying 70 per cent of their

at the outbreak of the war amounted to 100 board feet of lumber and half a cord of fuelwood from every acre of forest land in France.

This does not, however, tell the whole story of what France has accomplished in forest conservation. Due to the conservative temper of their race, forest owners, public and private alike, have not cut as much as they might; they have not used the full current revenue from their timber capital. They had accumulated a surplus by the outbreak of the war probably equal to four and a half billion feet, or twice the usual yearly cut. This surplus, together with the uniformly well-stocked and productive condition of their forest lands, was a prime element of national strength in the great struggle. The longer the 20th Engineers operated in France, the more



A MILL OF THE AMERICAN EXPEDITIONARY FORCE IN THE DUNES OF SOUTHWESTERN FRANCE

timber and all of their fuelwood from the current production of their forest lands.

Prior to the war, there were cut yearly from the forests of France 2,250,000,000 feet of timber and 4,670,000 cords of fuelwood. In addition to these amounts, some 400,000,000 feet of timber and 167,000 cords of fuel were obtained yearly from trees planted along roads and canals, from farm hedges, and from the plantations of poplar which are a common feature of farms throughout central and northern France. It is probable that France contained, in 1914, at least 150 billion feet of merchantable timber. The adequacy of her forest resources, however, was judged—not by the quantity of stumpage but by the current yield of forest land. The yearly cut

timber their scouts located. Our early conceptions of timber shortage in France were constantly revised upward. The enormous demands of the allied armies could have been met for one or two years longer without cutting seriously into the growing stock of the country.

The progress of France in forestry, like that of any other country, is of course an intimate phase of her own historical and economic evolution, the result of her peculiar physical conditions and the racial characteristics of her people. Its special interest to Americans lies in the fact that it is not a policy created by imperial edict—but the freely adopted regime of an intensively democratic and individualistic people. It would be futile to

(Continued on Page 1424)

WHEN TREES GROW

BY PROF. J. S. ILLICK

CHIEF, BUREAU OF SILVICULTURE, PENNSYLVANIA DEPARTMENT OF FORESTRY

NOTHING about the numerous processes of trees is more readily comprehended than that they grow, for the results of growth are so obvious, and in some cases striking, particularly in temperate regions where annually a period of vegetative rest alternates with a period of vegetative activity.

The belief is prevalent that trees grow throughout the general growing or vegetative seasons, which embraces the middle states from 150 to 200 days, and extends from the last killing frost in the spring, that is, when the leaves of the larches, birches, cherries, and maples appear, to the first killing frost in the autumn when the leaves exhibit their autumnal coloration. This, however, is a mere supposition, for most of the native and introduced forest trees in the vicinity of Mont Alto, Pennsylvania, make *ninety per cent of their height growth in less than forty days*.

The following tabulation, based on data obtained in Pennsylvania, lists five representative species of forest trees, gives the date in spring when the growth of each

starts, indicates the percentage of the total growth of the season opposite specified dates, and schedules the progress, duration, and cessation of growth.

Not all forest trees begin to grow at the same time. Some start early in spring while others begin rather late.

The Wild Black Cherry, *Prunus serotina* is the first forest tree in the vicinity of Mont Alto to begin height growth. The elongation of its twigs starts about the fourth of April. The Domestic Cherry, *Prunus avium*, begins its growth about four days later than the native Wild Black Cherry. The Sweet Buckeye, *Aesculus octandra*, begins about April 6, White Pine, *Pinus Strobus*, about April 18, Tulip Tree, *Liriodendron*

Tulipifera, about April 25, and Norway Spruce, *Picea Abies*, about May 6. The date when the different species start the elongation of their twigs depends upon the inherent tendency of the species and the factors of the environment. The late opening of the buds of Norway Spruce is not a local characteristic, but an inherent tendency, for records from Germany show that they usually

DO YOU KNOW THAT

Trees make nine-tenths of their height growth in less than forty days?

Most trees start growing in April and stop growing in May or June?

Trees grow twice as much at night as during the day?

Some trees grow steadily during the growing time and others rest for days and then continue their growth?

That two rings may sometimes represent only one year's growth?



EUROPEAN LARCH IN FULL FOLIAGE

A coniferous tree which sheds all its foliage each autumn. Lower buds begin to swell early, leaves emerge rapidly, but elongation of shoot does not begin until about the middle of May.



TERMINAL SPRAY OF PITCH PINE

Showing the original and the second growth of the season. Pectinate rings are regularly formed when a prolonged resting period occurs within the growing season.



LATE SPRING AWAKENING OF NORWAY SPRUCE

During early May the buds usually begin to swell. Elongation of the twigs begins at the base of the trees and proceeds upwards.

open after May 8, and in the extreme northern part after the end of May. On the other hand, factors of the environment, such as latitude, altitude, exposure, shade and shelter, also have a strong influence on the starting time of the season's growth. As a rule, buds open about two and one-half to three days later with each degree

early part of June. Only a few species continue their growth into July. On June 10, 1919, I examined 79 different species of trees in the vicinity of Mont Alto, 55 of which, that is 70 per cent, had already ceased growing in height. On June 18 and 19, 1919, I examined 50 species of trees in the vicinity of Bedford, Pennsylvania, and found that the height growth of 40 had already stopped. This is an unusually high percentage of growth cessation, and is probably due to the extremely cold period during the early part of May, followed immediately by an unusually hot period during late May and early June. Such extreme temperatures and the abrupt transition from one extreme to the other are potent factors in retarding growth and in extreme cases may cause entire cessation of growth. The White Pine, which usually stops growing in the vicinity of Mont Alto about June 15, but may continue to grow as late as June 30, ceased growing this year (1919) about June 3. It is the writer's belief that 85 per cent of the forest trees of Pennsylvania have already (June 20, 1919) completed their normal height growth for the season. Of the remaining 15 per cent of the Tulip Tree, Sycamore, and the Larches are prominent species, which may continue to grow until the middle or latter part of July. By the

| | Wild Black Cherry | Sweet Buckeye | White Pine | Tulip Tree | Norway Spruce |
|---------------|-------------------|---------------|------------|------------|---------------|
| Growth Starts | April 4th | April 6th | April 18th | April 25th | May 6th |
| April 15 | 7.5% | 67.5% | 00.0% | 00.0% | 00.0% |
| May 1 | 15.0 | 35.0 | 12.1 | 1.2 | 00.0 |
| May 15 | 25.0 | 100.0 | 46.2 | 23.4 | 22.4 |
| June 1 | 42.5 | } | 92.1 | 58.8 | 74.1 |
| June 15 | 62.5 | | 98.8 | 88.8 | 99.2 |
| July 1 | 87.5 | } | 100.0 | 97.4 | 100.0 |
| July 15 | 97.5 | | | 98.9 | |
| August 1 | 100.0 | | | 100.0 | |

of latitude and about two to two and one-half days later with each 350 feet of altitude. White oak begins its growth from seven to fourteen days later on northern than on southern exposures on the Mont Alto State Forest. Trees with small and partially or completely imbedded buds such as Honey Locust, Black Locust, Kentucky Coffee-Tree, Tree of Heaven, and Catalpa, begin growth relatively late. Nature seems to protect the tender growing points of these trees from the cold of winter by placing them within small buds which are almost completely imbedded within the twigs. This means of adaptation also protects the tender new growth of spring from late frosts, for the small and deeply imbedded buds are not stimulated so early in spring as large exposed buds; hence, the resultant vegetative growth usually appears after the damaging frost period.

Pennsylvania is the meeting ground of many northern and southern forest tree species. The northern follow the mountains towards the south and the southern extend northward through the valleys. The distinctly southern species, which are decidedly sensitive to spring frosts, as a rule, begin the elongation of their shoots rather late, that is, after the danger period of frost damage is past. The Eastern Catalpa, supposedly a native of the South Atlantic States, does not leaf out until the latter part of May. Likewise other southern species, such as Persimmon, Kentucky Coffee-Tree, and-Bald-Cypress postpone the beginning of their vegetative elongation until late spring.

The range of the period during which the height growth of forest trees ceases is longer than that during which height growth starts in the spring. The Sweet Buckeye, *Aesculus octandra*, usually completes its growth at Mont Alto as early as May 10 to May 15, and by June 15 one can find full-sized winter buds. This species is the first to complete its height growth of the season. Most species of forest trees in southern Pennsylvania cease growing during the latter part of May and the



THE WHITE OAK MAY TAKE A REST

The large fully developed leaves are the result of the original growth of the season. After resting for 20 days, growth was resumed, and the terminal shoot bearing immature leaves is the result.

first of August the normal height growth of all the forest trees of Pennsylvania has, as a rule, ceased.

In order to determine the progress of the height growth each species must be examined by itself, for each individual species possess distinctive inherent growth characteristics. Some place their growth without a break, while

others place it by leaps and bounds alternating with rest periods. In this respect the method of working followed by trees, and growth surely is work, differs little from the methods of other organisms, including man. Rarely does any organism work continuously, but rest periods are usually, and sometimes frequently, interspersed between the periods of work. Rest periods, however, should not be regarded as synonymous with idleness, for

frequently and at irregular intervals, but are hard to detect with instruments of ordinary precision. Rest periods of longer duration are also common and readily measurable.

The height growth of a Chestnut Oak, *Quercus Prinus*, tree during the 1918 growing season showed the terminal shoot started to grow on April 17 and continued its elongation until May 23, when the first upward thrust ceased. A resting period of 24 days followed and on June 16 growth was again resumed and continued until July 13, a period of 27 days. The first growing period extended over 34 days during which the terminal shoot elongated a total of 10 inches, that is an average of approximately one-third of an inch per day. This was followed by a cessation of growth for 24 days when the second and final elongation of the season began. The second growing period extended over only 27 days during which the terminal shoot elongated a total of 13.5 inches, that is an average of one-half an inch per day. Such a periodicity of growth is not unusual, but rather peculiar to



JUST BEFORE HEIGHT GROWTH STOPS

The twigs of Norway Spruce take a decidedly drooping position for a few days just prior to the cessation of height growth.

they are normal prerequisites to the optimum functioning of all organisms. Without them no organism can attain optimum efficiency nor maintain health.

Few comprehensive statements can be made regarding the growth behavior of forest trees during the growing season. There is wide divergence between the height growth behavior of Wild Black Cherry, Sweet Buckeye, White Pine, Tulip Tree, and Norway Spruce. Yet, in spite of this wide divergence the fundamental features of the growth procedure throughout the growing season may be summarized as follows: *Growth begins slowly, after a variable period rises rapidly, then reaches a maximum which is maintained for a short while, finally falls gradually to a minimum, and then ceases completely.*

The actual growth is, however, less regular than charts indicate, for the rate of growth usually exhibits a certain rhythm or periodicity. It progresses by leaps and bounds alternating with rest periods, which may be of long or short duration. Rest periods of short duration occur



TAKING A DAILY MEASUREMENT OF GROWTH

The terminal twig of Norway Spruce is the last to begin its elongation, but by the end of the growing season it exceeded all others in length. Some trees grow in height more than one-inch each day during the grand period of growth.

certain species. Pin Oak, Black Oak, Chestnut Oak, and Pitch Pine frequently begin to place a second growth 10 to 25 days after the original growth of the season has ceased.

The period during spring and summer when height growth does not progress may be regarded as a *resting period*, a *recuperative period*, or a *period of preparation*.

The trees apparently rest but in reality they are preparing for the next upward thrust which may be longer than the original advance. Furthermore, the writer believes that the recurring rest periods may become a rather fixed and regular feature of the growth of certain species. This is certainly true in the case of normal young Pitch Pine in the vicinity of Mont Alto which exhibits annually



AFTER HEIGHT GROWTH HAS CEASED

Immediately following the completion of height growth the twigs of Norway Spruce assume an erect position, begin to stiffen, and develop winter buds.

a cessation of growth for a period of two to three weeks.

The rate of tree growth not only fluctuates throughout the growing season but also during each day. The maximum growth usually occurs late at night, apparently after the preparation and translocation of food and other essential materials becomes less active, and the minimum growth falls in the afternoon of each clear day when the greatest activity in the manufacture of starch and sugar is in operation.

About 20 trees of each of the four species given in the following tabulation were measured regularly at 7.30 P. M. and 7.30 A. M. for a specified period. The derived results for height growth during the day and at night are given in the following tabulation:

| SPECIES | DAY | NIGHT |
|---------------------|-----|-------|
| Tree of Heaven..... | 35% | 65% |
| Tulip Tree..... | 40% | 60% |
| Norway Spruce..... | 18% | 82% |
| White Pine..... | 39% | 61% |
| Average | 33% | 67% |

This tabulation shows that trees grow about twice as much at night as during the day. By using instruments of greater precision the percentages would no doubt be changed somewhat, but the general comparative rate of growth would still stand unchanged.

To some persons it may appear that the problem of growth behavior of trees has only an academic application. This point of view is, however, untenable for there is an economic side to the study. If conducted in a scientific manner it will supply the basic data for the preparation of a rational schedule for transplanting in the nursery and setting out trees in the woodlot and forest. Foresters, silviculturists, and plant physiologists recommend that planting and transplanting operations should be conducted when the material to be planted is in a dormant condition. No fault can be found with their recommendation, but in order to execute it properly one must know when trees really are dormant. This can



A "DOUBLE-HEADER" OF HEIGHT GROWTH OF CHESTNUT OAK

Height growth often proceeds by leaps separated by rest periods of variable duration. The original growth of the season bears mature leaves, while the second period of growth is characterized by a sparse setting of immature leaves.

be ascertained best by determining when trees grow, since growth is so evident and measurable, and whenever trees are not growing they are dormant, that is, in a static condition, the duration of which is hard to determine.

Furthermore, such a study facilitates the preparation of a schedule for field work covering the problem of growth. That determination of the quantitative and

qualitative growth on cut-over lands is one of the most important and urgent problems in American forestry is conceded by the most authoritative foresters. This is one of the four major problems which the chairman of the forestry committee in the Division of Biology and Agriculture of the National Research Council recommends as worthy of immediate and thorough consideration. Heretofore, we have generally been instructed that the height growth of the season cannot be accurately ascertained until late in fall or during the winter months when the weather is relatively unfavorable for field work and the days rather short. Consequently, it now follows that since trees actually cease growing in height in May or June, no reasonable exceptions can henceforth be filed against the collection of height growth data immediately after the cessation of growth in summer.

It should be understood, however, that the problem WHEN TREES GROW is but a prelude to the major problem, which is far more comprehensive, and includes also a study of diameter and volume growth of the stem and the growth of roots, all of which should be undertaken; for the results derived therefrom would be of great economic value.

A knowledge of WHEN TREES GROW also aids in the determination of the best time to peel bark. Bark

can be peeled satisfactorily only when the sap is abundant and active. Briefly, the bark peeling season coincides with the growing season of trees, even to the extent that lumbermen recognize a "second sap" period during June in Chestnut Oak trees. This furnishes practical proof that the second period of growth recurs rather regularly in this species. The second period is usually short and the bark does not peel so satisfactorily as in the first period of the season. It is, therefore, recommendable that the period of active growth be accurately determined

for each species, the bark of which is peeled, in order to determine the exact limits of bark peeling season.

A thorough study of the growth of trees will also furnish much-needed information to the legal profession. Many legal decisions concerning boundaries and titles hinge on the question whether each growth ring represents the growth of one season, or if fictitious rings are sometimes formed. The writer examined a large number of Pitch Pines and Chestnut Oak trees and found that fictitious rings are regularly formed when a prolonged resting period occurs within the growing season. Hence, in some cases two rings represent the growth of a season, instead of one annual ring.

The problem — WHEN TREES GROW is not only of technical interest and economic value but might be used as a means of developing real tree appreciation among the children of our public schools. The best soil in which to plant love for trees is the heart of childhood and womanhood. The present lack of a fuller appreciation and a more compelling warmth towards the out-of-doors in which we daily move and often toil is largely due to the kind of education practiced in the past and still retained in a few ultra-conservative communities. It is pedagogically criminal to instruct the boys and girls of the United States concerning the Eucalyptus trees



THE OLD AND THE NEW

Not an evergreen tree decorated with candles but a Pitch Pine with its characteristic erect new growth.

of Australia, the Big Trees of California, the Yew trees of England, and the Cypress trees of the South without mentioning the White Oak, Chestnut, Tulip tree or White Pine which may stand near the schoolhouse door. And merely to mention the names of these trees is not sufficient. This simply serves as an introduction, but if the children are also instructed concerning their growth and other activities they begin really to know these trees, and will continue to observe and study their habits.

WE WANT TO RECORD YOUR MEMORIAL TREE PLANTING. PLEASE ADVISE THE AMERICAN FORESTRY ASSOCIATION, WASHINGTON, D. C.

CENTRAL PARK TREES STARVING TO DEATH

BY CHARLES LATHROP PACK

PRESIDENT, AMERICAN FORESTRY ASSOCIATION

TREES in Central Park, New York City, are starving to death. Four thousand or more have died since 1917. Three thousand of the dead have already been removed, the others will be taken out in the next few months. Hundreds are dying now and many of them may be considered a total loss. Some of the weak and sick are to be given special treatment in the endeavor to save them and they may be saved.

Various causes contribute to the present deplorable condition of the trees in this famous park of the largest city in the United States, causes which in one way or

selection of species for planting, and methods for bettering conditions of the unhealthy trees which remain standing, and their report indicates that much can be done to improve the situation.

Park Commissioner Francis D. Gallatin and City Forester J. S. Kaplan have, for several months, been closely studying the causes which result in the failure of certain species of trees to thrive and they have already adopted measures to improve soil conditions and provide the trees with more nourishment. This will undoubtedly be effective in many instances but it will not be thoroughly effective



DEAD WHITE ASH

An example of the effect of hard packing of the soil about the roots, dense grass sod, and full exposure to sun and wind. This tree is near 72nd Street and 5th Avenue and by proper care could doubtless have been saved.



NOURISHMENT LACKING

A typical surface soil condition along Fifth Avenue. Note the shallow spreading root system and hard packed soil about the base of the tree, one of the conditions which lead to the starvation of the park trees.



DEAD LINDEN

This tree of fine dimensions was killed by the bad surface soil conditions. This part of the park is often thrown open to children and other visitors for play and the earth is hard packed wherever it is not grass coated.

another affect tree growth in a great many city parks throughout the country. What has happened in Central Park may happen in many other parks, and the measures being taken to save the stricken trees which remain should be carefully studied by park commissioners and city foresters of other cities in order to aid them in overcoming similar conditions which may exist under their jurisdiction.

The American Forestry Association engaged two expert foresters to make a careful examination of the trees in Central Park, the soil and the climatic conditions, the

tive because of the fact that some species of trees, planted many years ago, are not suited to withstand the hardships which they encounter in the park. The relief measures will aid them, but, perhaps, only temporarily, while permanent relief may be obtained only by the removal of such species as will not thrive and their replacement with trees so hardy that they will withstand both the soil and climatic conditions which make careful selection of species and great care of those selected imperative.

There are some 60,000 trees in the park and about 4,000 of them were killed during the Garfield winter,

1917-1918. While the cold was severe, zero weather continuing for a long period, the trees which died would, in the large majority, have withstood the winter had they not been weakened by long years of malnutrition.

The chief handicap which species with a deep root system have to face is the fact that the soil in Central Park is only from two to five feet deep and that at a depth of five feet there is a heavy clay which the roots cannot penetrate. Consequently, when a tree reaches an age at which its roots should go deeper than five feet the clay prevents penetration and the trees lack sustenance.

In many cases the experts making the examination for AMERICAN FORESTRY found that trees would be greatly aided by the earth at their base being broken up. Numbers of trees were being choked by the hard earth cover-

poplars, fourth, the lindens and last, the maples and several other species.

There are a great many varieties of trees suitable to park planting and practically all of them vary in some way from each other in their requirements of soil, moisture, etc. Let us look over several species commonly found in Central Park in regard to their soil and moisture requirements. Take the elms. In general, the elm is one of the species found most often in Central Park. It is used on the outer edge to shade the walks surrounding the park, on the Mall, and often is met with throughout the interior. Many of them are rapidly approaching death. The once famous cathedral aisles of elms along the Mall have gone entirely, and along the borders of the parks on Fifth Avenue, Eighth Avenue and the two end



DYING TULIP

The soil about this tree was packed hard by the constant playing of children and the grass kept using up the soil moisture beyond the bare ground. The tree is slowly dying.



DEFOLIATED BEECH

This 22-inch tree was an out-crop of rock. The soil packed hard and exposed to full sunlight about the roots makes it impossible for the tree to thrive.



A YELLOW PINE

This tree suffered from a shallow soil, a windy site, and exposure of the soil to direct rays of the sun. The result is stunted development and early death.

ing their roots or by heavy grass growth close around them decreasing their nourishment.

Climatic changes, smoke and dust also undoubtedly adversely affected the trees but these are conditions which cannot be overcome and trees hardy enough to cope with them should be planted whenever new planting is undertaken.

THE DEAD AND DAMAGED.

Of the 3,000 dead trees removed in the last two years the greater number were Oriental plane trees which had been frost cracked and killed by the 13 degrees below zero weather of the Garfield winter. Next in number of dead were the elms, third came the oaks and Lombardy

streets of the park one can scarcely find an elm of healthy appearance. The other species of elm have apparently withstood the strain better but they, too, are seldom to be found in strikingly vigorous condition.

Being so much used, the elms' ability to endure the very trying conditions in Central Park is of great importance. Let us see what the requirements of the elm are for best development. A well known authority upon dendrology writes of the elm: "It never occurs (naturally) on dry upland (on account of root habit). In the juvenile stage the root is shallow and spreading, rarely reaching a greater depth than three feet six inches the first year, while the shoot may be twice as long. A

typical swamp type. At maturity the root system is wholly superficial, rarely penetrating the soil to a greater depth than two and one-half feet. The tree attains its largest size and best proportions on deep, moist, fertile bottomlands. It does particularly well on fine silt and clay lands that retain the moisture in the surface layers, so that till soils and uplands soil that retain moisture in the surface layers will support this tree. The soil is not important where the moisture conditions are suitable." From this it can be seen that the elms are able to grow well in Central Park, but it is not as a whole a very good site for it, much of it being upland and not too well watered. The elms growing there, therefore, would be living nearer the boundary line between sickness and health that would be the case with some other species, and a sudden succession of changes in growing conditions or

found entirely defoliated but frequently thin crowns are apparent. English oak, red oak and scarlet oak were found in excellent condition although some showed signs of deterioration by being stag-headed, *i. e.*, with dead tops.

The beech is another heavy sufferer. In fact if anything it has suffered even more severely than the elm, only not being plentiful it strikes the attention less. The beech does best on a deep, rich soil, but any soil with plenty of moisture in the central layers will maintain it.

The Oriental plane tree, or sycamore, is a common tree in Central Park, and an excellent one for such planting, being bothered by very few insect or fungus attacks, and being very hardy. It is badly injured by severe frost, however.

The lindens are often to be seen in the park, but are not



ALMOST DEFOLIATED BEECH

Note thick grass about the tree and the exposure to the full light of the sun from the direction of the camera—the southeast—where the chief sunlight comes from resulting in the depleted vitality of the tree.

DEAD ELM, FINE OAK

The elm is in typically "park" conditions, open to the sun and wind and with grass about the roots. The pin oak has half of its roots protected from sun and wind by the natural undergrowth of the forest.

POOR AUSTRIAN PINES

In general none of the evergreens do very well in the trying conditions of Central Park. Note the short tree in the dense grass. No really fine and strong Austrian pine was found in the park.

attacks from insects or fungus enemies would have a very severe effect upon them.

Another very common tree is the pin oak. To quote from the Manual of the Trees of North America, by Sargent: "Borders of swamps and riverbottoms in deep, moist, rich soil" are the sites best suited to this tree. It is self-evident to anyone who knows Central Park that the pin oak will only occasionally find such sites in Central Park. This tree also, then—as situated in much of Central Park, must be growing under a handicap and therefore will be more easily injured by changed or injurious conditions. At the present time it is seldom

as hardy under city conditions as a number of other trees, requiring for best development a deep, rich, fertile, moist soil. It is also much subject to insect attacks.

The Catalpas are trees of great vigor of growth, and are often met with in Central Park. They also do best on a deep, rich, moist soil, but having deeply penetrating, wide spreading root systems, they are less affected by surface drying of the soil than many other species.

One of the most beautiful of all the trees in Central Park is the tulip tree or yellow poplar. Growing to a great height and with deep, wide spreading roots, it will do splendidly on soils that are not too shallow and which



DEAD TREES AT SOUTHERN END OF THE RAMBLE

On this slope, which was made up of a fairly heavy clay soil with rocky outcrops nearby, there were dead hickories, red maple, tulip tree, and pin oaks, all of about the same size and pretty close together. Note the tops of the dead trees against the sky.

are not too dry. Its best growth is on rich, fertile, deep soil.

A tree with much the same kind of root system as the tulip is the cucumber tree. Naturally the species is only found on deep, moist soils, and when so placed grows into a tree of large size and great beauty. It is found in several places in Central Park.

The silver maple is very common but is a poor tree on account of the brittleness of the wood, being often badly injured by winter storms. It is a poor tree to plant, but a number of them are found in Central Park.

Another common species of tree often met with in Central Park is the Norway maple. This is a species from Europe and is the most hardy and most resistant of all the maples for city planting. It should, therefore, do well in Central Park.

There are a number of hard maples in the park, and they make a handsome ornamental tree. The species requires for its best growth plenty of moisture in the surface soil and preferably a great deal of humus in the soil also.



FINE ELM STRANGLED BY THE SIDEWALK

The space about the trunk is only about two and one-half feet wide, and the asphalt sidewalk and drive have smothered the roots. This fine old tree is on the corner of 59th Street and 5th Avenue, and, with proper treatment, would have been a fine shade tree for many years to come.

The red maple which is common in Central Park is really a bottomland tree; at least, it grows best in moist, even in wet soils, although it also is found on uplands. It is apt to suffer from lack of moisture when planted away from streams or lakes.

Horse chestnuts and buckeyes are very frequently encountered in Central Park. Their natural site is along streams and on rich bottomlands with plenty of moisture in the soil. They are living under a strain whenever they are planted on dry sites.

The honey locust and the black locust, also found in the park, are both trees with deep, wide spreading roots, and able to grow on a great variety of soils, the latter being especially able to stand very hard conditions. For the best development, however, they both need deep, fertile, moist soil.

Scattered occasionally through the park are the botanical freak trees called the Ginkgo or Maiden Hair tree. This species comes from China and is in America entirely free from all enemies and fungus or insect world. It is very hardy and will



ALL THAT IS LEFT OF THE FAMOUS CATHEDRAL AISLES OF ELMS ALONG THE MALL

The young elms on the right without foliage are recently planted, and should come out in one or two years like the small elms on the extreme right. But the condition of the large elms on the left—which have not reached the age limit for this tree makes the planting of more of the same species on the same site open to question.



A CLUMP OF WHITE PINES

Shallow soil—a rocky outcrop was only about 75 feet away—exposure to wind and to the direct rays of the sun, no shading of the ground under the trees, all work together with the dust-laden air of the city to stunt and kill these trees which are capable of making splendid growth on a favorable site.

grow well almost anywhere. It is a very striking tree in general appearance, and one of the best of city trees.

Another exotic species is the Ailanthus, or Tree of Heaven, also from China. Like the Ginkgo, this species is very hardy and will thrive where most other species would die. It is even more hardy than the Ginkgo, and is doing well in the park.

The wild black cherry is very commonly found in Central Park, especially in the northern portion on the forested sections. It will grow on many varieties of soil, and the moisture conditions are not exacting, but they must be uniform for the tree to attain large size.

The white ash is also a common tree in Central Park and its crown is frequently thin owing to the hard conditions it has to face. It is a tree which is rather exacting in moisture requirements, but will reach large size when it is on a well-watered, porous soil.

The common cottonwood often encountered in Central Park is another tree with a good deal of capacity for standing city conditions as long as it has

plenty of moisture in the surface soil. Its soil requirements are much less important than its moisture demands.

Of the evergreens, none do really well in the dust and bad air of the city, while of the pines, the white pine is often found in Central Park, but it needs abundant and constant moisture in order to attain to its best growth.

The Austrian pine is another frequent factor in the make-up of Central Park scenery. It is hardy and can withstand city conditions fairly well, although, of course, influenced by them to some extent, and is not as healthy in Central Park as it should be.

These species of trees are in general the principal trees met with in Central Park. Now, let us examine the park and see what success has been made in growing them there. Taking them in order of their resistance to hard conditions:

The elm is in a class by itself and how it has suffered is told in a previous paragraph.

The beech, not so plentiful as the elm, has perhaps been more injured than any other species in the park.

Next in order come the red maple, and the lin-



WHERE HEAVY CLAY HINDERS TREE GROWTH

About this little drinking fountain the soil is a very heavy clay—almost like putty. This has been the means of the death of the three trees in the background. The tree on the right has been killed by the placing of an asphalt walk right up to it on one side and from appearances to within a foot or so on the other.



THE ELMS ALONG FIFTH AVENUE

This picture was taken in the second week in September. Note the loss of foliage and the hard packed soil around the base of the trees. There was little or nothing to shade the soil about these trees from the sun.

den. These two trees were rarely found to be in good condition and often were found partially if not wholly defoliated.

A group of four species comes in at this place in the list, tulip, pin oak, white ash, Austrian pine. They were seldom found entirely defoliated but frequently their crowns were very thin. The tulip poplar sometimes had fine form but with small, poor foliage.

Another group contains cottonwood, English oak, red oak, scarlet oak and sycamore, and these in many cases showed signs of deterioration by having dead tops, although many are still in good condition.

Sometimes the soil will be badly drained and will tend to collect and hold too much moisture, having the tendency to smother the roots of the trees by shutting off all air. Then again, the soil may be shallow and will, therefore, tend to dry out very quickly, thus leaving the trees without water. Then the condition of the sub-soil may make a great difference in the tree growth. If the sub-soil is very heavy and impermeable to water and to the roots of trees, it will greatly impede tree growth if it is too close to the surface, or it prevents moisture from coming up from below into the surface soil. Under such conditions breaking up the sub-soil with dynamite



THE WHITE BIRCH

Nowhere is the European white birch found really doing well in Central Park and here it had splendid forest floor conditions with plenty of shade and humus, but it did not thrive despite these.



FAST FALLING ELMs

American elm near 59th Street, 15 inches in diameter and planted on an east slope where the full effect of the sun on the ground will be felt most. Note the dense cover of grass about the roots of the tree.



POOR RED MAPLES

This tree was nearly defoliated. The soil was very shallow and there was a large, rocky outcrop just to the left of the picture. Many of the other red maples in the park are like this one.

The last class of all, containing trees which showed little or no sign of any kind of having suffered contained the Ailanthus, Ginkgo, cucumber, Norway maple, Catalpa.

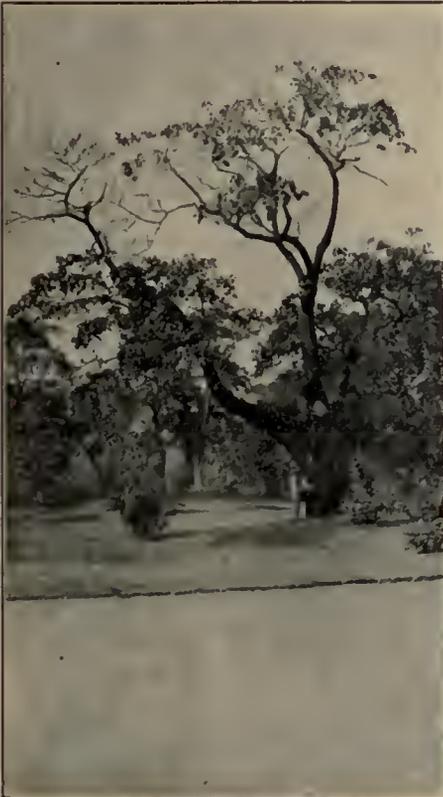
DEPLORABLE SOIL CONDITIONS.

Soil conditions in Central Park are undoubtedly the most severe handicap to the health of the trees. Most common trees desire a fairly deep, well-drained loamy soil with plenty of humus (decayed vegetable matter) mixed in with it, especially in the surface layer of three to six inches. If too loose and sandy the rain water will soon drain off and leave the trees waterless, and if the soil is too heavy, like a fine dense clay, the water falling on it will tend to form pools on the surface and evaporate and be lost to the trees that way. Also a heavy clay soil will tend to interfere with the growth of the roots.

has been proved to be effective. Again, hard packing of the surface soil by people walking upon it, covering the soil with cement or asphalt walks or roads will tend to impede tree growth. Now, many of these difficulties and hindrances to tree growth exist in Central Park today. Shallow soil is very common, often only a few inches covering up the rock below. Heavy impermeable clay is also present in places. A hard packing of the soil around the bases of the trees is quite noticeable along Fifth Avenue. And exposure of the soil to evaporating winds and to the direct rays of the sun is everywhere common. Add to this the frequent proximity of asphalt walks and drives and the frequency of a dense sod of grass growing under the trees, and it is easy to see how difficult it is for a tree to secure normally good soil conditions in Central Park.

Now it has been the duty of officials of the Park Department ever since it was organized to know these things, to realize the handicaps with which the trees have had to contend and to take measures to overcome these handicaps. That this has not been done by the Park Department officials in the past is evident by the condition of the trees today and the difficulties with which the present Park Department officials have to contend. The trees would be in much better condition had they been properly nourished. They should have been carefully and skillfully fertilized, the shallow soil could have been enriched year after year and if it had been, the trees would have been hardier, stronger and better able to withstand the rigors of the Garfield winter as well as the climatic changes of the past few years.

in its annual report for 1919, which said, "The New York City parks bear very noticeable marks of the exceptionally cold winter, 1917-1918. In the spring of 1918 it was observed that many trees and plantations failed to put forth their leaves, and as the season advanced it was found that they had died either from the intensely cold winter or from cold weather and weakened condition due to disease. The great privet plantations along Park Avenue, some of them fifteen years old, were practically destroyed. The privet hedge around Claremont Inn on Riverside Drive had to be cut back to within a foot of the ground or entirely replaced. All over the city the privet showed damage in various degrees and it is estimated that the loss of this ornamental shrub alone amounted to \$75,000.



A DYING CATALPA

This very large and picturesque catalpa is old and the open situation, grass and exposure to wind and sun is proving too much for it. It will probably last but a few more years.



A TYPICAL TULIP

Note the small size of the leaves, the soil packed around the base of the tree by the visitors and the grass on all sides. The foliage of a healthy tulip is much larger.



A BLACK WALNUT

Standing on the top of a steep rise, surrounded with heavy grass sod and exposed to the full sunlight and wind, the soil conditions for this large American black walnut are very bad.

Even the elms, now so pitiful in appearance, could have been given such care, that they would have thrived even under the adverse conditions which they had to face. They have done well in other cities and in other parks where the soil is just as shallow and where they had many difficulties to overcome and they did well because they were given plenty of individual attention.

It is essential in park management that the Park Commissioners and the City Forester should be absolutely free from political influence and should be provided with sufficient funds to do their work well. Political forestry cannot be successful.

Attention was given to the tree losses of the park by the American Scenic and Historic Preservation Society

"Next to the privet the greatest sufferer was the plane tree, or Oriental sycamore. This tree was particularly free from pests and was planted in the belief that it would be immune from winter killing. These trees were largely in the streets where their loss is particularly grievous as it is hard to make trees grow in New York streets on account of pavement, gas leakage, damage by automobiles, etc.

"Other trees which were killed included turkey oaks, horse chestnuts and lindens. In Central Park there were perhaps 400 turkey oaks, 5,000 lindens and 3,000 horse chestnuts. These trees fell easy victims to the weather for they had been defoliated and their vitality sapped for three years in succession by the tussock moth.



TWO FINE HICKORIES

In the northern part of the park there is a good deal of natural forest growth and while some of the trees there have died most of them are doing well. These hickories, as is apparent, have taken hold finely.



HEALTHY RED OAK

The soil about this tree on the West Drive was loose and untramped down. The small fence has had a tendency to keep the people on to the walk. The grass would be better absent from under the tree.



FINE HONEY LOCUST

The honey locust seems to do very well in the park even when the site conditions are not ideal. It would be a good thing to plant more of them, even if they are difficult to prune on account of the thorns.

"The one tree of all the nursery-grown trees in the park that seems to have suffered no damage is the Ginkgo. Not one has been found to be killed and few have frost cracks. Even the solitary Ginkgo planted by Li Hung Chang at General Grant's tomb, which is one of the most exposed places in the city, weathered the winter without harm, while the bladdernut tree, planted by the same personage at the same time, immediately adjacent to the park, was all but destroyed.

"In January, 1919, Commissioner Berolzheimer announced that over 3,000 dead trees had been removed in his jurisdiction up to that time."

RELIEF MEASURES ADOPTED.

The Department of Parks makes the following announcement regarding the situation: "Park Commissioner Gallatin has announced, as a result of extensive investigations, a definite programme for the restoration and stimulation of the trees in Central Park.

"Through the acquisition of a 'K' machine for pulling dead trees and stumps out of the ground, it has been found that the basic trouble with the trees in Central Park is the fact that the native sub-soil is of a stiff impenetrable clay, and that the reason trees die after they grow to be about one or two feet in diameter, is because of the inability of the roots to secure nourishment after they reach this clay sub-soil.

"It is very fortunate that we were able to secure a hand-power pulling machine, which made it possible to tear out stumps practically intact, as it discloses this condition very frankly. This situation was known to the

planners and builders of Central Park as very frequently in the removal of a stump of this nature, earthen pipes of two inches in diameter are found, which were placed both horizontally and vertically through the clay, and occasionally a large group of boulders was piled immediately under the newly planted tree, designed probably for the purpose of breaking up the clay so that the roots could firmly establish themselves.

"It is the opinion of Forester J. S. Kaplan that unless something is done to remedy this situation, it will never be possible to grow trees larger than from two to three feet in diameter in Central Park.

"Commissioner Gallatin has concluded that sub-surface blasting is the remedy most likely to be successful and most easily and cheaply to be tried.

"As a result of a conference with representatives of the DuPont Powder Company, arrangements have been made to take one lawn in the lower end of Central Park for experiments in this direction. Holes will be drilled about 18 feet apart, and a light charge of dynamite placed in each hole with the object of shattering this cementitious sub-surface clay.

"This practice has been successfully carried out among orchardists elsewhere, and it is highly probable that marked results will ensue from this treatment. This work is to proceed immediately after the leaves fall this year. It is also intended to plant several trees on this lawn in blasted holes.

"If this experiment proves successful it is Commissioner Gallatin's intention to request sufficient money to treat practically all of Central Park in the same way."



A HEALTHY PIN OAK

Note the bushes which shelter the soil about part of this fine young pin oak in the Ramble from the direct rays of the sun. This helps very much in making the tree strong and vigorous as readily seen.



A SPLENDID COTTONWOOD

The cottonwood is a river bottom tree and here close to the Swanboat Pond it has shown its capacity to develop into a beautiful ornament for the park. It is, undoubtedly, an ideal site for this species.



VIGOROUS ENGLISH ELM

The English elm stands the conditions of the park better than the American elm. This tree had very good site conditions for it had been cultivated about the roots which were shaded by rhododendrons.

THE EXPERTS' OPINION.

The experts report to *AMERICAN FORESTRY* that under the head of unfavorable soil conditions they have found in Central Park shallow soil, heavy impermeable clay and hard packing of soil around trees.

Under the head of species especially sensitive to the Central Park conditions they have found elm, beech, red maple and linden.

Trees which will make fair growth in Central Park under specially favorable conditions there they have found to be tulip, pin oak and white ash.

Trees that have demonstrated their ability to do really well in many sections of the park, they have found to be cottonwood, English oak, red oak, scarlet oak and sycamore.

For practically any sites in the park, even the unfavorable places, either the Ailanthus or Ginkgo can be always counted upon.

The cucumber, Norway maple and Catalpa will all grow splendidly when on their proper sites in the park. Off of their proper sites they will not do so well there.

In regard to meteorological conditions influencing trees during the last twenty years it is clear that:

1. There has been a decided decrease in rainfall.
2. Much of this decrease has been in the summer months when needed most.
3. There has been a decided decrease in relative humidity in the past five years.
4. There has been an increase in the wind movement in the past five years.

5. The trees have been subjected to a very severe frost in the winter of 1917-1918.

With all of these factors before us it is only natural to seek to come to some conclusion as to what the cause of the present situation of the park is and from that to reach out for a solution. Briefly the conclusion as to the cause of the present situation of Central Park, is that no one single, but a combination of causes all detrimental to the successful maintenance of Central Park trees are operating. None of these conditions alone would entirely bring about the present situation and therefore the changing of any one will not cure it entirely. All must be taken into consideration and all must be worked upon.

THE CONCLUSION.

The conclusions reached by the experts follow:

1. Selection of only such species of trees for planting as have proved either entirely hardy under present conditions or at least have done well on certain special sites in the park. This, of course, applies only to the planting of trees on a large scale, specimens of arboricultural interest being entirely another matter.

2. Special attention to the establishment and maintenance of proper surface soil conditions under the trees. It is the soil-moisture conditions of the trees which is the one great thing to watch out for in dealing with trees anywhere and especially in a park where the trees are planted singly and are exposed to severe drying conditions of the surface soil around them. The establishment and maintenance of proper conditions for preserving soil-moisture in Central Park might entail:

(a). Cultivation of soil around all trees of special interest or value, and the more the better.

(b). Mulching or covering the soil about the trees with manure, dead leaves, etc., during the winter.

(c). Planting trees in small groves or "woodlets" and keeping them in the form of small patches of natural forest (leaving the leaves and small twigs to decay on the ground and so form a natural mulch).

(d). Underplanting the larger trees with more shade enduring species which would shade the ground, protect from wind and so prevent drying out.

These suggestions would perhaps cost a great deal of money or a change in the principal present-day policy of the park management but is not the end worthy of such expense and change? To anyone passing through the park on any bright day in the warmer months the value to human life—especially child life—of the open, outdoor stretches of natural growth, so different from the narrow, dirty, noisy streets in which most of the park visitors were born and now live, is ample to warrant a great increase in expenditure by the city to save and energetically maintain the tree growth within this, the

most famous of all American city parks. At the present time and under the present system many of the trees of the park are much retarded in growth and a large number have died. Some of these latter have been of large size and fair age, but it is clear to the careful observer that practically all of them should have lived for a good many years longer and there is good reason to believe that if proper care and enough money had been devoted to them, they would still be shading the walks and lawns instead of going to the woodpile. Now, when too late the trees are dead and the expense of taking them out and planting new ones comes up, while the public waits for years for the new tree to attain good enough proportions to fill the blank left by the dead specimen.

The situation confronting New York as a result of these findings will, perhaps, fit many other cities in the United States. We have all seen beautiful trees "just die" and the layman is at a loss to understand why they should. The New York park officials are alive to the situation, and are trying to improve it while knowledge of just what is best suited to Central Park conditions is of the utmost value to every city forester and park department official.

PLANT MEMORIAL TREES FOR OUR HEROIC DEAD



THE NORWAY MAPLE

This tree has been benefited by having the soil about it cultivated to some extent and also shaded. More than that, it is not on a windy site. It thrives under these conditions.



THE GINKGO

Note the peculiar outspreading branches. All of the ginkgos that were noticed in the park were growing well. There are, in this country, no insects or fungi which attack this tree.



CUCUMBER TREES

These two large trees in the Ramble show the good development of this species under conditions favorable to it. Compare their appearance with others not so well situated.

A POLICY OF FORESTRY FOR THE NATION

BY HENRY S. GRAVES

UNITED STATES FORESTER

AMERICAN FORESTRY MAGAZINE HEREWITH PUBLISHES SOME MORE OPINIONS REGARDING THE NEED OF A NATIONAL FOREST POLICY AND THE KIND OF A FOREST POLICY PROPOSED BY UNITED STATES FORESTER HENRY S. GRAVES. COL. GRAVES' OUTLINE OF THE PRINCIPLES OF SUCH A POLICY WAS PRINTED IN THE AUGUST ISSUE OF THE MAGAZINE AND A FURTHER OUTLINE IS PUBLISHED HEREWITH. FORESTERS, LUMBERMEN AND TIMBERLAND OWNERS THROUGHOUT THE COUNTRY HAVE BEEN INVITED BY THE AMERICAN FORESTRY ASSOCIATION TO EXPRESS THEIR VIEWS ON THIS VITALLY IMPORTANT SUBJECT.—EDITOR.

A NATIONAL policy of forestry seeks the protection and beneficial utilization of our present forest resources, the renewal after cutting of forests on lands not needed for agriculture and settlement, the stability of forest industries and of satisfactory conditions for forest workers, and the restoration of forest growth on lands now unproductive and idle.

The public interests in the continuance of forests justify and require direct ownership of extensive areas, and also participation by the public in working out the problem of protection and renewal of private forests. A program of forestry for the nation should include action by the public through the Government and the States, action by land owners and operators, and the means of uniting the efforts of all for the achievement of a common purpose.

The service of forests is not alone local; it is national as well. For the products are widely distributed without reference to State lines, the industries are engaged in interstate business, and the protective benefits of forests often extend far beyond the localities where they are situated. It is the function of the Federal Government to take the leadership in formulating a national economic policy that gives consideration to the relationship of all forests to the industrial life of the country. The central Government alone can bring about concurrent and harmonious action within given regions. Its research and educational work may be directed to the problems of the nation and of regions that comprise more than one State. Representing the whole Nation, the Government can stimulate and guide local action where individual States by their own efforts would fail. The Government can act to organize all agencies affected by the forest problem in a united undertaking to inaugurate and carry out a program of forestry.

The States have not only the function of handling the public forests owned by them, but they have also a direct responsibility in the protection and continuance of private forests. In this, the Federal Government should take part to meet interstate and national prob-

lems, to stimulate action by the States, and to bring into harmony the efforts of the different States. In the problem of private forestry, the Government would work through and in cooperation with the States. The legislation affecting the private owner in the matter of protection and continuance of forests should be by the States. The Government should help the States in formulating plans and developing methods and by direct assistance in carrying them out. The assistance offered by the Government should be contingent upon the States taking legislative and administrative action to provide for the protection and renewal of their forests.

A national policy must recognize the problems of the private owner of forests. Greater security of forest property from fire, better returns from timberland in the long run, and more stable industrial conditions must be sought. A program in which the public participates and recognizes industrial problems, like taxation, would enable private proprietors to handle their forests in a way not to be a public injury but to serve in building up the localities in which they are situated.

PUBLIC FORESTS.

There should be an extensive program of public forests, owned by the Nation, by the States, by municipalities, and, too, by quasi-public institutions and organizations. The public forests today comprise about 25 per cent of the total forest area of the country. They should be extended to include ultimately from 40 to 50 per cent.

In any plan of extensive public holdings, whether Federal or State, provision should be made for returning to the communities a share of the receipts, as is done in case of the National Forests, or otherwise to compensate them for withdrawing the lands from taxation.

The Federal Government should not only provide adequate support properly to protect and develop its forest properties; it should also rehabilitate, by planting if necessary, the depleted and wasted cut-over and burned lands.

DURING THE LAST SIX MONTHS THERE HAS BEEN A GREAT DEAL OF DISCUSSION REGARDING THE NEED OF A NATIONAL POLICY OF FORESTRY AND WHAT SUCH A POLICY SHOULD COMPRISE. DURING THAT PERIOD I HAVE HELD MANY CONFERENCES WITH FORESTERS, LUMBERMEN AND OTHERS INTERESTED IN THE QUESTION IN DIFFERENT PARTS OF THE COUNTRY, AND HAVE PRESENTED CERTAIN PRINCIPLES WHICH I BELIEVE SHOULD UNDERLIE SUCH A POLICY.

I HAVE RECEIVED MANY INQUIRIES REGARDING VARIOUS POINTS IN THE POLICY AS I HAVE SET IT FORTH. I HAVE THEREFORE PREPARED A STATEMENT MORE COMPREHENSIVE THAN HERETOFORE IN ORDER TO CLARIFY THE OBJECTIVES AND WHAT STEPS SHOULD BE TAKEN TO ATTAIN THEM. THIS STATEMENT MAY BE OF INTEREST IN CONNECTION WITH THE DISCUSSION OF A NATIONAL POLICY OF FORESTRY.

HENRY S. GRAVES.

NATIONAL FORESTS.

The Federal holdings should be extended by purchase, by exchange of stumpage for land, and by placing under permanent administration forest lands now in the unreserved public domain.

The program of acquisition should seek two classes of forest land:

1. Areas needed for the protection of water resources, to prevent erosion, for recreation and other general public purposes. These should include both virgin forests and cut-over lands.

2. Cut-over lands, with the purpose of insuring the production of lumber and other products and of establishing demonstration areas and centers for Federal cooperation with States and private owners.

The present Weeks Law program contemplates the purchase of about one million acres in New England and five million acres in the Southern Appalachians. This program should be completed as fast as is compatible with public financial conditions, and should be extended to include other important areas needed for watershed protection and other general public service. Lands acquired for protective purposes as well as those for lumber production should be distributed through all forest regions of the country.

The acquisition of cut-over lands by exchange for stumpage would serve to consolidate and block out the National Forests of the West. This principle has already been recognized in several special laws applicable to certain Forests.

There are still forest lands in the public domain which should be added to the National Forests. There are several million acres of such lands outside of Alaska. The great forests of the interior of Alaska should also be placed under adequate protection and administration.

STATE FORESTS.

The States should establish public forests, with the same general objectives as the Federal Government, and with special reference to the economic and industrial needs within their boundaries. Many western and southern States still own forest lands received from previous grants from the Government; these should be placed under permanent forest administration, with provision for the settlement of areas suited to agriculture. Lands reverting to the States for taxes or otherwise should, where practicable, be retained and used to build up permanent public forest reservations.

OTHER PUBLIC FORESTS.

Every encouragement should be offered to municipalities to establish public forests or woodland parks. These may be necessary to protect the local water supplies, or to serve as public recreation grounds; and in many instances they may yield products that will help in a material way to reduce local taxation for schools or public works. Permanent institutions and organizations of a quasi-public character should also be encouraged to acquire forests and handle them on the basis of continued production.

PRIVATE FORESTS.

The safeguarding and perpetuation of forests on private lands are possible through an organized system of protection, through the prohibition of destructive processes that produce waste lands, and through the promotion of constructive and entirely practical measures of forestry. The participation, liberal cooperation, and direction of the public in working out the problems involved are necessary for success.

FIRE PROTECTION.

The objectives of fire protection are:

1. To prevent destruction and injury to standing timber by fire.
2. To safeguard young growth already established within the older timber and on cut-over lands.
3. To promote natural reproduction so far as this can be done by fire protective measures.

Effective fire protection is achieved only through a joint undertaking between the public and private agencies in which all lands, regardless of ownership, are brought under an organized system. Such a system requires:

1. An effective service for preventing forest fires and detecting and suppressing those which may be started. Such a service already exists in a number of States.
2. Improvements needed for the prompt detection and suppression of fires. These include roads, trails, lookout stations, properly located stations for rangers, bases for airplanes when these are used, and so on.
3. Measures to reduce the inflammability of the forests. These may consist of lopping the tops, as is practiced in parts of the East; or burning the brush in piles as conducted in many pine stands on the National Forests; or burning over at the proper season cleared areas, protected by fire lines, as in heavy Douglas fir stands; or in felling dead snags, as is required in many National Forest timber sales; and in other measures. In some places fire lines may be desirable, as practiced in southern California; or carefully controlled burning at the proper season of strips and selected areas, as is practical in certain open pine forests. Uncontrolled light burning should be prohibited everywhere.

4. A vigorous campaign of education of the public regarding the danger of forest fires and the need of cooperation on the part of every user of the woods.

5. A systematic campaign of law enforcement, in which all citizens should be asked to cooperate, to punish those who by carelessness or intent start fires or permit their spread.

There should be incorporated in the forest laws of every State requirements to bring all forest owners into the protective system, and to extend it to all cut-over and unimproved lands in the State, together with the disposal, by lopping or burning, of dangerous slashings and other special measures that the local conditions may require.

There should be provided by the State the administrative machinery necessary to carry out the work effectively.

The public should share in the burden of protection. The division of cost will necessarily vary in different States, as is now the case among those States which have inaugurated such a system. The public may properly bear the cost of the State-wide patrol system, including overhead, inspection, lookouts, and similar items, and a portion of the fire suppression costs.

In general, the cost of the preventive system should be shared about equally between the public and the owner of the land. At the present time assistance by the States and the efforts of the private owners alike are inadequate. Measures like brush disposal are essentially a part of the logging operations and should be a charge against it.

The Federal Government should grant liberal aid in fire protection, far greater than at present. Its aid should be contingent on the State's inaugurating and carrying out such a system as above described. This financial help should not exceed in amount that appropriated by the State.

As in fire protection, the spread of dangerous insect infestations and diseases requires the aid and direction of the public. Both the National and State Governments should participate and appropriate liberally to check the depredations.

FOREST RENEWAL.

The renewal of forests on lands not required for agriculture and settlement is an essential feature of a national policy of forestry and an effective program should be worked out in each State, backed by appropriate legislation and efficient administration, which will achieve this object on private as well as on public property. As in the case of fire protection, forest renewal on private lands requires the participation and aid of the public.

There are two problems of forest renewal; first, the restocking of lands already cut over and now in a condition of waste; and second, that of providing for natural reproduction as the timber is cut. Where there is still seed or seed-bearing trees on cut-over lands, continued fire protection may in many cases suffice for restocking. Where there is no chance for natural reproduction, planting or sowing will be necessary. The public will have to take over a large portion of these lands and restore them to productivity. In many other cases owners may be induced to restock their waste lands as a business undertaking.

Provision for forest renewal should be made at the time of cutting. Sufficient restocking of the average private tract can be accomplished by natural reproduction without resort to planting or other intensive measures. On certain types of forest, renewal will result from fire protection alone. In many instances of unrestricted exploitation, however, fire protection alone does not suffice to secure renewal and to prevent the lands becoming waste. If protection alone does not suffice to secure forest reproduction, the owners should be

required to adopt such measures as may be necessary to accomplish this, with cooperative aid by the public in working out the problem as a practical undertaking. As in the case of fire protection, the additional measures necessary for forest renewal should be made a part of a systematic program in which the public and private owners engage in a joint undertaking with a common objective.

The first steps in this undertaking are to determine in each region:

1. The circumstances under which fire protection alone will not suffice to prevent wasting of the land under prevailing methods of lumbering.

2. The additional measures necessary to secure conditions favorable for natural renewal.

3. The classes of land upon which forest growth should be continued.

4. The cooperation that should be given by the public to make feasible in practice the measures that may be necessary for the owners to take.

5. The legislation needed to bring these measures into practice, as a part of the State's program of forestry.

As in the case of fire protection, the plan for special measures and for forest renewal should be worked out through State legislation and administration, with the assistance and backing of the Government. The Federal Government should seek to secure concurrent action by the States within given economic regional units, to bring about uniform standards of practice, to conduct experiments and research, to grant material aid in various ways, and to act as a coordinating agent to bring together the different local agencies into full cooperation. The Government should make its assistance to the States contingent upon effective action by the latter.

Measures of forestry upon private lands sought by the proposed program fall into two classes: first, those necessary to prevent the lands becoming waste after lumbering; and second, those which seek a maximum production of timber and other products. The first class of measures should be required on all lands that ought to remain in forest growth. The measures to secure maximum production are of a more intensive character. They should be encouraged in every way but would not be obligatory. They involve a larger initial investment, and they render a larger ultimate return to the owner. Under the second class fall such measures as planting where needed, leaving a larger number of seed trees, cutting in favorable seed years, leaving medium sized trees even though now saleable for a second cut or for cover, various kinds of thinnings of second growth, organization of the forest work on a basis of sustained annual yield, and so on. Experiments should be conducted by the public to establish and make generally known the best practice in each region. Advice by public officers should be freely afforded. Planting stock should be offered at cost by the public. Taxes should be adjusted to encourage owners to undertake the methods found to be most efficient, and other measures of

aid given as indicated in the last section of this statement.

Every encouragement should be afforded to bring about close utilization of timber in the forest and to prevent losses in the handling and use of the manufactured product. This will be accomplished largely through cooperation and research, in bringing information to the knowledge of operators and users of wood products. It is a problem of investigation and industrial education, in which the public should take the leadership.

PUBLIC ASSISTANCE AND COOPERATION.

In a national policy of forestry the public itself should assume certain responsibilities and it should assume certain burdens. It should cooperate with and assist private owners in carrying out their part of the undertaking. The measures of cooperation fall under the following heads:

1. *Fire Protection.*—As already indicated, the public should directly share the burden of fire protection, especially in a preventive system and in the cost of suppression.

2. *Assistance in Forestry.*—The public should assist owners in working out plans for cutting that will promote natural reproduction, in planting, and in other measures of forestry. The State should offer planting stock at cost and cooperate with the owners in establishing plantations.

3. *Taxation.*—The States should adopt a form of taxation calculated to encourage good forest practice. The present methods of taxation, with their lack of uniformity in application, often tend to promote premature and wasteful cutting and to discourage forest renewal. To promote action by the State, the Federal Government should assist the States to investigate the current methods of taxation, their effect in causing premature and wasteful cutting and in increasing the difficulties of holding cut-over lands for tree growth, and should assist in drafting model tax laws applicable to various forest conditions.

4. *Forest Loans.*—Existing legislation concerning farm loans should be extended to include loans for the purchase and improvement of forest lands, to encourage the holding of lands previously acquired, where the purpose of the owner is to hold and protect cut-over lands or those having growing timber, to reforest lands by seeding or planting, or to use other measures in promoting forest production. To obtain the benefit of such loans, which should be for a maximum period of 50 years, the land owner should enter into a specific obligation to retain the land in growing timber and protect and care for it during the life of the loan.

5. *A Survey of Forest Resources.*—Funds should be provided whereby the Federal Government in cooperation with State and private interests may make a survey of the forest resources of the country. This would

determine the quantities of timber suitable for different industrial uses, the current consumption of forest products, the probable requirements of the different regions for material, the possible production of the forests by growth to meet these requirements, and other matters which will aid in developing the national forest policy.

6. *Land Classification.*—The public should cooperate in land classification to aid owners to put their lands to the most productive use. The public should aid in bringing settlers upon lands suited to agriculture, discouraging speculative undertakings that lead to the deception of innocent investors and efforts for the colonization of lands unsuited to the purpose. Land classification would indicate the classes of lands which should be devoted to the production of timber, either permanently or pending a development which would make possible their successful settlement.

7. *Research Work.*—Adequate funds should be provided to enable the Government and other public agencies to carry on investigative work needed in carrying out a national policy of forestry. This would include investigations on a larger scale than at present in determining the best methods of forest practice, and also research in forest products.

THE NATIONAL PROGRAM.

A program for the nation must be an aggregate of local programs adapted to different conditions, and correlated and standardized through the Federal Government to meet the broader requirements of the whole country. A national program cannot be put into effect in its entirety at once. Local programs will also probably have to be worked out by steps. Some States are already able to go forward more rapidly than others, partly because of their financial strength and partly because experience has already demonstrated the methods of protection and forestry required to secure results on the ground.

The initiation of a national policy of forestry requires as one of the first steps the passage of a Federal law that recognizes its objectives and provides authority and means for the Government to extend cooperation with the States in the protection and perpetuation of the forests under their jurisdiction along the foregoing lines. At the same time, Federal appropriations for the purchase of forest lands should be greatly increased.

Much can be accomplished pending such a law. Thus, there should be at once a joining of hands in a most vigorous campaign for fire protection, that will educate the public to the dangers from fire and lead to more effective action in all forest regions. Individual States should go forward with plans for better legislation and larger support of forestry. But the passage of a basic Federal law with the aid that the Nation can offer would make possible the inauguration of a policy that would secure results impossible without such national action.

A PROGRAM FOR PRIVATE FORESTRY

BY H. H. CHAPMAN

PROFESSOR OF FORESTRY, YALE FORESTRY SCHOOL

THE agitation for securing forestry practice on private lands is due; first, to the rapid destruction of the forests on lands privately owned, a nation-wide condition; second, to the growing need for forest products; third, to the inadequacy of the method of public ownership of forest lands to solve the problem on a quantitative basis, because of the small percentage of forest lands publicly owned.

I believe absolutely that public ownership and management is the best method of growing timber, and this is generally admitted by foresters and economists. But owing solely to the expense and slowness of the process of acquiring title to lands now owned privately, foresters are seeking means to check the destruction of forest values on private lands and preserve their productiveness.

Private owners have a keen appreciation of forest values of all kinds, including stumpage value of merchantable timber, protective value of forested slopes, aesthetic value of parks, and even commercial value of half grown timber. But their general desire is to realize or cash in on these values by sale of property or timber, or by turning the forest products into cash. In the process, the forest as a productive "plant" or property is wrecked or gutted as effectually as the Huns stripped the factories at Lille—and it takes just about as much patient investment and far more time to restore such forest property to productiveness.

Lumbermen, especially sawmill men, representing as they do the *business* of converting forests into cash, conduct their business logically on this basis and as a class are not interested in what becomes of the land as *forest land* after cutting. Most of them will admit this and justify it. Many are interested in forestry, provided they themselves do not have to practice it. Most of them resent, and desire to avoid, criticism for this policy, but since it is the logical economic plan for them to pursue as far as they have been able to figure it out, they go ahead on those lines, cutting out their stumpage, and abandoning the worn out mill and plant on completion of the cut.

For this policy the lumberman need not be considered either crazy, stupid, or criminal. He is a good average, short-sighted American, differing in no way from other operators who desire to skim the cream of a project, and with far more logic behind him. It pays the farmer who *owns* his soil to maintain its fertility, but the renter often resorts to skimming. It pays any business to adopt methods for securing permanence, with reduced depreciation and labor costs and greater efficiency—but the lumberman has not been able to compute the profit in maintaining and renewing his raw material by the slow growth of the forest species, which does not keep pace with his mill capacity, based as it is on large output and low *manufacturing* costs.

Self interest and public interest do not always coincide, but they are seldom diametrically opposed. The public benefit requires the curbing of selfish activities, and this usually results in the curtailment of immediate financial profit whose acquisition would result directly in public loss perhaps of a permanent character. By this curbing of greed, a business may even be made unprofitable. This usually indicates that the public benefits of this business do not offset the injuries and damage resulting from its conduct.

If a business is necessary to public welfare, which is the only excuse for its existence, public regulation will soon cause an adjustment which makes it possible to continue as before, and usually at an equal profit.

The short-sighted policy of utter destruction of private forest property, like the placer gold mining of the west, may have to be terminated in the public interest, for several reasons. We will continue to need forest products, grown on these lands, after the present supply is exhausted, if we are to continue to enjoy our present standard of living and not retrograde like the Chinese. Waste land incapable of agricultural use is an economic plague spot in a community, which can be cured by restoring forest values. Productive land, whether forest or agricultural means taxes, roads, schools, population, markets, prosperity and character. The reverse means poverty, lack of transportation, ignorance, degeneracy, insanity, and pauperism. If the reader does not believe this it is because he has never investigated conditions where such causes have operated for two generations. Those who destroy forest values create prosperity during their operations, but insure a permanent condition of destitution to follow.

We are passing through a transition stage in this country, when the process of skimming our national resources, soil, forests, and minerals, is giving way to permanent ownership and management. What is the lumberman going to do with his skinned forest land in the future? The process of selling it off to prospective settlers as agricultural land will be more and more curtailed by the interference of the same public interests, which, slow to awaken, now bid fair to adopt the principle that land must be suitable for agriculture before being disposed of to such investors. This is another example of interference with immediate profits, because of public good! Are such land owners going to oppose the educational efforts of the government, and the attempts of states to secure land classification for fear it might prevent them from unloading worthless lands on prospective farmers? The corollary of the operation of skinning the forest is to skin the settler. Yet there is evidence that many such land owners balk at this process, and sincerely desire to find some true values and real uses for their cut-over

lands—*any use except forestry*, for of this they are firmly persuaded that it is impractical, impossible, and unprofitable.

My own belief is that it is going to become increasingly impractical, impossible and unprofitable for owners of forest land which is non-agricultural in character to do anything else with it except to grow timber upon it, and that the process of passing the buck by exchange of ownership does not relieve the purchaser of the problem, nor will it suffice very much longer for such land owners to seek to nullify the efforts of foresters to emphasize these conditions, by applying the damning epithet of "theorist." Those lumbermen who did service in France know that forestry is not a theory. They also know that our economic conditions are rapidly approaching those of France. Foresight on our part is needed as much as it was for the French. They applied it—will we?

Close study of many areas of timber land in the south and elsewhere has convinced me that the skinning process applied to these operations actually loses money to the operator compared with that of reserving a small per cent of the less matured trees, and that reproduction even of Longleaf pine is easily obtainable by the use of simple and easily applied measures of protection. But the average timber land owner does not wish to believe this and looks only at the difficulties. He is not in the forestry game and refuses to enter it or even consider it.

If the cure for this deadlock lies in legislation we must secure the following conditions:

First, the risks of timber production as a business must be reduced. This means better fire protection, better laws for exclusion of tree diseases and insect pests, and better enforcement.

Second, proper tax legislation. This means a workable tax law removing the annual tax from timber, and imposing instead a products tax. We have no workable laws at present.

Third, actual land classification into agricultural and forest lands. If anyone thinks this is easy he is no farmer.

Fourth, capable, trained, non-political state departments of forestry with both the knowledge of forest

technique and silviculture which will enable them to advocate intelligent measures of forest regulation, and the power to enforce such measures.

Finally, we may be in position to secure by regulation the measures needed to preserve the forest land from the destructive processes which now characterize private operations.

If we begin at the other end of this chain of development, what do we get? Restrictive measures, of course, designed to force private owners to practice forestry. These measures will be formulated by politicians, or legislators, ignorant of the technique of forest production, and will be almost certainly impractical and calculated to defeat their own ends, like much of the "diameter limit" legislation which seems to be the first thought of such statesmen. Having passed such laws, we will have politicians to enforce (?) them—and they will be evaded or repealed. We will find it impossible to enforce them on land claimed to be agricultural and there will be no authoritative classification of such lands, hence no possibility of actual enforcement. Meanwhile the same legislatures which seek to regulate the owner of land will continue to sanction increasing burdens of taxation on standing timber, and may fail to provide an adequate system of fire protection to insure the survival of the plantations or young timber which they seek to force the owner to raise.

The development of forestry by states has been by no means negligible. Progress has been made in securing good and workable fire laws. Experiments have been attempted in reform of state tax legislation as affecting forests, and a determined effort has been made to keep forestry out of the miasma of party politics. But this latter struggle resembles the labors of Sisyphus, who, as soon as he succeeded in rolling the stone to the top of the mountain, witnessed its smashing descent into the depths. The biggest problem we have in this entire forestry movement is how to secure and keep trained men in charge of state forestry organizations, for without such men, we will never get even halfway up the slope of achievement in the program of securing actual forest production on private forest lands.

LET ALL SIDES BE HEARD

BY R. D. FORBES

SUPERINTENDENT OF FORESTRY, LOUISIANA DEPARTMENT OF CONSERVATION

DO we need a national forest policy, and if so just what form should this policy take? The lumbermen and the foresters of the country seem to be getting together rapidly to solve this problem. Their getting together, however, reminds one of a couple of cats, with their tails tied together, hung over a clothes line. If you don't believe that, read some of the recent discussions in the lumber journals, notably the *Lumber World Review* of Chicago. A great many articles on national

forest policy from far abler pens than the present writer's will have appeared in the columns of AMERICAN FORESTRY, and instead of addressing himself to an attempt to shed new light on the subject, he would like to make a suggestion as to one means of remedying the lack of cooperation between the lumberman and the forester in solving this problem.

No one can read the various articles pro and con which have appeared in the press of the day without

feeling that the cause of disagreement between the foresters and the lumbermen is a lack of understanding of each other's point of view. There has been a lot of good time wasted on both sides demolishing arguments that were never raised, or statements that were never made, by the opposition. And as usual under such circumstances, the less a man knew, the more positive he has been in his statements. Lumbering and forestry have been too far apart in the past. It is not at all necessary that every forester be a lumberman or every lumberman, a forester, but it certainly is essential that the forester be acquainted with the basic economic facts upon which the lumber industry rests, and that the lumberman understand the principles of forestry, before either can discuss a national timber land policy in an adequate and constructive way.

To emphasize these truths, there follows a quotation from Professor R. C. Bryant, of the Yale Forest School, who is in the very front of the small group of foresters who have a thorough understanding of the lumber business. He says: "It is one of the weak points in the profession (the forestry profession) that as yet we have not developed forester-economics who can speak authoritatively on the many vital problems affecting forests and forestry. . . . Why are not foresters called into consultation by courts and Government agencies on questions involving tariff legislation, export policy, lumber transportation, and like issues? It is, I think, largely because we have been content in the past to devote our attention to the problems which seem more closely related to forestry and have neglected the broader economic phases of the subject, which did not seem at the moment of so great interest or of such vital importance." On the other hand, to prove the contention that the lumbermen are very inadequately acquainted with the foresters' aims and work, let me ask our lumbermen friends how many of them have ever discussed forestry with professional foresters, or read articles on forestry subjects in the *Journal of Forestry*, which is the official organ of the Society of American Foresters, and reflects current opinion in the profession. AMERICAN FORESTRY has for years, of course, endeavored to place forestry before the public, but its efforts have necessarily been confined to brief and popular presentations; exhaustive and more or less technical discussions were not suited to its purpose. Certainly the meaning of forestry has been sadly twisted by some of the lumbermen when they have discussed it in the past, and this is reasonably attributable to the lumbermen's failure to inform themselves, through reading and study, on forestry subjects.

To remedy this situation why not let us all go back to school temporarily and take an examination on the subject of forestry and the lumber industry? Let the officials of the National Manufacturers' Association appoint a committee, preferably a one-man committee, to draft half a dozen questions regarding the broad economic conditions underlying the lumber industry. Let these questions be such that an intelligible answer to all six can be

made in 3,000 words. Let the Society of American Foresters appoint a similar committee to draft six questions on the fundamentals of forestry, which can likewise be adequately answered in 3,000 words. Then let a long-suffering jury of about five men, or any number deemed advisable, be chosen by joint action of the Lumber Manufacturers' Association and the Society of American Foresters to grade the replies received to both sets of questions. Every contestant would be known to the judges only by a key number, and be required to reply to every one of the twelve questions. Allow the contestants access to all of the literature on forestry or the lumber industry that they may care to delve into (for the good of their souls or for the purpose of answering the questions) and require all the papers to be in at the end of a three-months' period. Finally let the associations named or any other good and interested citizens put up a substantial sum in the form of cash prizes, say \$500, to be divided among the three best writers. Other details could be worked out very simply, but for the benefit of all concerned the writer suggests that in judging the papers plainness of language and avoidance of technicalities be considered a virtue second only to knowledge of the facts.

I at once hear the sneer of the self-made man, who says: "Some smart aleck from a college can write a better paper than a lumberman who has been knocking out his 100,000 feet a day for the last 25 years. An examination on paper is no fair test of a man's abilities. Put the same college youth at the head of a sawmill and logging job and see how long he would last." In reply, let me say first that it would hardly be practicable to test our contestants out except in some such way as I have suggested. Secondly, let me call the objector's attention to the fact that the United States Forest Service, headed by a technical forester and directed in all of its branches by either technical foresters or men who have grown up with the forestry profession, today administers 150,000,000 acres of land, has charge of about 18 per cent of the stumpage in the United States, and employs some 2,500 men every year. It expends around \$4,000,000, and takes in about \$3,500,000 annually, and will soon be self-supporting. It is a bigger concern than any lumber company in the world, and in spite of entire lack of precedents it has, within fifteen years, built up a very efficient organization. Any man who has been Supervisor of a million acres of national forest land in the west and has handled successfully the tremendous multitude of details connected with the administration of that million acres is no mere dreamer, but an exceedingly practical business man. The forestry profession is composed 99 per cent of men who have been in the business not over 20 years, and considering their youth and the difficulties which they have encountered, no fair-minded man can deny that they have done much hard and exceedingly practical work. Let us make a test of the foresters' knowledge, as compared to the lumberman's knowledge, of the whole field of forestry and lumbering.

WHAT THEY SAY AS TO A FOREST POLICY;

TREE culture and tree conservation should be taught and practiced.—*Chicago Tribune*.

The American Forestry Association is doing good service in linking the causes of roads and forestation.—*New York Times*.

It is a subject calling for a national forest policy.—*St. Louis Globe-Democrat*.

The statistics are certainly alarming.—*New York Tribune*.

We must plant trees as we plant corn.—*Hamilton, Ohio, Republican-News*.

We still refuse to learn from the countries of the Old World.—*Florida Times-Union*.

An appalling indictment of American carelessness.—*Cleveland Press*.

This is a matter of first importance.—*Rochester Democrat and Chronicle*.

In times of peace the loss of fifty millions in property at a single time would stir the world.—*Cincinnati Times-Star*.

From every side is heard words of praise for the American Forestry Association.—*Chicago Evening Post*.

The increase of trees and shaded highways will add millions to the scenic value of the country.—*Minneapolis Journal*.

Nor have we been able to think of a more lovely memorial than a colonnade of trees.—*Cincinnati Enquirer*.

We should seek to have the two improvements go hand in hand—re-forestation and road construction.—*New Orleans Times-Picayune*.

The American Forestry Association earnestly aims to promote the beautification of public highways.—*Salt Lake Tribune*.

The American Forestry Association's efforts should be pushed and in the South especially it should be given the encouragement which it merits.—*Charleston, S. C., News and Courier*.

It is to be hoped the American people will take kindly to the plan of the American Forestry Association, not only as a matter of sentiment, but as a matter of common sense.—*Lincoln, Neb., Star*.

Development of a practical highway system and regrowing of our vanished forests are two cardinal points of the *Chicago Tribune's* "Middle West Program" as outlined in a stirring editorial on the need now of waking up and going to it in a business way. Contrasted with the picture the *Tribune* paints is the view of a writer in the London (England) *Morning Post*, who,

following a trip to the battlefields, writes:

"It is the silence I can't get over. Heaven knows Chateau Thierry and the villages of the Marne were not silent places in '17 and '18. There were men and noise there then. All round about you on this lonely road are the dancing poppies and above you is the Chemin des Dames with its silent and suffering trees. The trees, indeed, seem to feel the woe of war more than any other thing in nature. Gas almost seems to break their hearts, so sad and broken is their appearance. These pale, withered birch stumps and the joyous,

Tree culture and tree conservation should be taught and practiced."

For the economic side of forestry we find the editors most keen. From the *Scientific American* we find the *Boston Post* quotes this expression of opinion: "And finally to meet the domestic and foreign demand at the same time, we are clearing out our forest resources at a rate which brings the end of our wood-using industries plainly in sight—not in the next generation, but in this one—not in the next 50 years, but well inside the next 20—and all because we have no government forest policy big

IMPROVING THE SCENERY



(San Francisco Chronicle.)

careless poppies are strangely contrasted legacies of war."

With this picture in mind turn again to the *Tribune* which says: "The forests of Wisconsin and Michigan were once the source of great wealth and throughout the Mississippi Valley can be profitably restored and new areas of growth established. The drainage and climate of the middle west call for trees. We know what deforestation has done for such countries as China. The states should include this subject in their public policy and carry on well considered programs suitable to their own conditions. Planting along roads should be encouraged, on hill tops and slopes, and on land less available for crops. Public forest preserves should be increased.

enough or broad enough to handle the situation." Commenting upon this the *Post* says: "Surely there ought to be wisdom and energy enough in the land, and especially in its Congress, to act upon these valuable suggestions. Treeless China should serve as a plentiful warning." The *Globe-Democrat* of St. Louis calls for a national forest policy, basing its editorial on figures sent out by the American Forestry Association. "Conservation of our forests still left, and the methodical planting of trees," says the *Globe-Democrat*, "are clearly demanded. It is a subject calling for a national forest policy and the steady attention of Congress. Timber is as essential as wheat for the general welfare of the country, perhaps more so as a fundamental economic matter." In the *Hamilton, Ohio, Republican-News* we find that "we must plant trees as we plant corn." The editor points out that "there are limitless tracts that will grow timber but will not grow food crops, and the scientific preservation of these forests by replacing all cut trees is a form of conservation to which our horse sense ought to

direct us to turn without further delay." The importance of forestry to the high cost of living is taken up by the *New York Tribune* which calls attention to the statement by Charles Lathrop Pack on the need of a national forest policy and uses figures in the call, "What Shall We Do About It?" on the front page of the *AMERICAN FORESTRY Magazine*. "The statistics are certainly alarming," says the *Tribune*. "Of 850,000,000 acres in our original forest area but one-fourth now remains. Nor is an adequate supply being grown. So it is up to the people as individuals. Apparently despairing of getting a national forest policy, Mr. Pack makes an appeal to his fellow-citizens." According to the *Florida Times-Union*, "we still refuse to learn from the countries of the

FOREST FIRES AND "ROADS OF REMEMBRANCE"

Old World the advisability of forest conservation." The value of a forest policy to France is pointed out in the *Evanston, Ill., News-Index*, which says: "If there had been the same ruthless destruction of trees there as there has been here, there would have been little wooded territory left for the emergency in which the future of the nation lay in the balance." The *Ohio State Journal* calls attention to the year by year stand of the Association for tree planting and adds: "War brought an unusual demand for lumber and great areas were stripped to supply pressing needs.

If we will not aid in growing trees we should not complain if growing scarcity makes us pay high prices for lumber." Forest fires come in for a great deal of attention on the part of the editors. "In times of peace, the loss of fifty millions in property at a single time would stir the world," says the *Cincinnati Times-Star*, "but we have become so accustomed to colossal figures, that today, we take but passing notice of them. Future generations, however, will take notice when lumber becomes an article more scarce and more expensive even than it is today." In the *Democrat and Chronicle* of Rochester, the editor further extends the invitation of the American Forestry Association for expressions of opinion on a national forest policy and in pointing to forest fire losses, adds: "This is a matter of the first importance. There is enough information now in the hands of the government and other forestry agencies to cut down fire losses materially." The *Cleveland Press* calls the situation "an appalling indictment of American carelessness. With the passing of our forests we will lose a great national industry that yearly employs 830,000 people and supplies \$1,500,000,000 worth of products." The *Toronto Globe* suggests that returning soldiers be put to work in fire patrols. The *Daily Northwestern* of Oshkosh, Wisconsin, calls attention to grazing sheep and their ability to diminish the fire hazard. The *Houston Post* points to fire losses and says: "It was a stern reminder that provision must be made for better fire protection. The nation will repent its folly in days to come, in exorbitant lumber prices." The *Bulletin* of Maysville, Kentucky, says: "We are destroying our forests much faster than we are planting new ones and renewing old ones. In the case of preventing forest fires, the old adage that an ounce of prevention is worth a pound of cure is particularly applicable, for the cure is a mat-

ter of decades." In the opinion of the editor of the *Akron, Ohio, Press*, "forest fires can be cut in two if human carelessness is eliminated." The *Post* of Cincinnati, says that in the passing of our forests the "lumber supply will be in the hands of the timber interests of Canada," and "it does not require many fires, such as now are raging in the northwest, to counteract all efforts at conservation."

As to roadside planting the *Chicago Evening Post* says: "From every side is heard praise for the American Forestry Asso-

ciation to bring civilization to these valleys." Speaking of the Motor Transport Corps cross-country demonstration, the *Tribune* continues: "The American Forestry Association is actively interested in the demonstration, its immediate aim being to promote the beautification of public highways by inducing states, counties, and rural communities to line their thoroughfares with trees." The *Journal* of Minneapolis points to the scenic value of tree planting and says: "The American Forestry Association has taken up the idea of tree planting along public highways. Aside from the sentiment expressed and the loyalty that will naturally be stimulated by this action, the increase of trees and shaded highways will add millions to the scenic value of the country and much more in the material value of the trees themselves. It would, indeed, be a blessing to this land if these 'Roads of Remembrance' should cause us to plant in America a tree for every tree destroyed in the war."

"It is to be hoped," says the *Lincoln Star*, "that the American people will take kindly to this plan of the American Forestry Association, not only as a matter of sentiment but also as a matter of common sense." The editor of the *Cincinnati Enquirer* views road side tree planting in this way: "Nor have we ever been able to think of a more lovely memorial of human life nor a more highly appreciated benefaction than such a collonade of trees." In *The State* of Columbia, South Carolina, we find the editor goes into discussion with the *New York Times* as to the value of various trees for memorial highways. *The State* concludes a well-shaded road would tend to allay the speed mania for "no one wishes to dart too swiftly through an avenue of beauty." The *Times Recorder* of Americus, Georgia, points to the hearty approval that has been given the Association's plan.

The *Times-Picayune* of New Orleans points to the campaign of the American Forestry Association to restore our forests and adds: "We realize, even more than the French, the necessity of forests, and it is but natural that we should seek to have the two improvements go hand in hand—re-forestation and road construction—and that the idea of planting trees along side the roads should be strongly advocated." The *Republican-News* of Hamilton, Ohio, asks "what better suggestion than that of so-called 'Roads of Remembrance' for memorials?"

REAL SERVICE

Flushing Daily Times.

The announcement by A. E. Davenport, chief of the construction department of the Texas Oil Company, that the fine old elm tree on the Whitestone avenue side of the property of the company has just acquired would not be destroyed, will be appreciated by every resident of Flushing.

That the tree would have come down under ordinary circumstances cannot be doubted. The *Daily Times*, in calling attention to the matter the day the announcement was made that this company had purchased the property and was planning the construction of a big service station, at once crystallized sentiment in favor of saving it.

The value of the elm as a specimen of its kind is demonstrated by the active interest in its behalf by the American Forestry Association. Although located in Washington and busily concerned with the larger questions of conserving the forests of the country, Mr. Ridsdale did not hesitate to come to the aid of this single tree.

The value of the service frequently rendered by newspapers to the community in which they are located and of the worth of an organization like the American Forestry Association are so clearly demonstrated in this instance that further comment would be superfluous.

ciation for the good service it is doing in linking the cause of roads and forestation. The trees are intended to be memorials for our soldiers who died in France and to their comrades who have come home bearing victory. Roads thus shaded and beautiful are called "Roads of Remembrance." In the *Tribune* of Salt Lake City we find that "this day, fraught as it is with great significance to the people of Utah, seem to be a propitious time to direct attention to the work of the American Forestry Association in its efforts to foster the 'Roads of Remembrance' idea. Roads and the observance of this pioneer anniversary go well together. In 1847 roads were the crying need of those who traversed the great plains and endured untold hard-

"BUILT-UP WOOD"

BY O. M. BUTLER

ASSISTANT DIRECTOR, FOREST PRODUCTS LABORATORY

RESearch in forest products, stimulated by war requirements, forecasts a far-reaching movement in the peace-time utilization of wood in new forms. One field of possibilities in particular stands out. In it lumbermen and foresters should be especially interested, because rapid advancement within the next ten or twenty years may be expected, and developments in this field may have a marked influence on the industry and the profession. This domain is the utilization of wood in built-up forms.

The trend of utilization is already strong in this direction. Built-up wood is by no means new. Before the dawn of history, the Horse of Troy, we have been led to believe, was a built-up wooden "steed of tremendous height," and on through the ages wood has been used in forms that were "built-up" in one sense or another. The

in the same way. During the war, built-up structural beams were approved by both the National and Chicago Boards of Fire Underwriters to meet the shortage of the large sizes of structural timbers, while lattice trusses of light-weight timber with the principal supporting members made of built-up stock were developed for government use to span walls as far as 100 feet apart. Recognizing that it would be a mistake for lumbermen and architects generally to adopt this form of construction without first having conclusive data as to the efficiency of specific types or standards of built-up designs, the Forest Products Laboratory now has under way, in co-operation with the National Lumber Manufacturers' Association, a series of mechanical tests on full-sized, built-up beams.

A number of factors may be mentioned as influencing this trend toward the larger use of built-up wood. New



EXPERIMENTS ARE BEING CONDUCTED UPON A WIDE VARIETY OF WOODEN ARTICLES AT THE FOREST PRODUCTS LABORATORY TO DETERMINE THE EXTENT TO WHICH THEY MAY BE MADE FROM LAMINATED STOCK. THE AIRCRAFT PROPELLER IS TYPICAL OF THE SUCCESSFUL COMMERCIAL APPLICATION OF LAMINATED CONSTRUCTION. THE OTHER ARTICLES ARE AS YET PURELY EXPERIMENTAL IN CHARACTER ALTHOUGH THE TESTS ALREADY CONDUCTED INDICATE THE POSSIBILITY OF SECURING VERY SATISFACTORY SERVICE FROM LAMINATED ARTICLES.

term, as here used, however, refers to the fabrication from smaller material of special forms or types of lumber to replace or to serve as substitutes for full-sawn or solid material. Two general methods of building up wood in this manner are now in use; one employs glue, and the other, nails, bolts, wooden pins, and other forms of fastenings, to hold the different parts or laminations together.

Glued laminations are quite widely used for the manufacture of a great variety of material for inside purposes, such as furniture, toys, mill work, etc.; but it has not found extensive application commercially for exterior or semi-exterior requirements, because the ready failure of the glue used when joints became exposed to rain or extreme changes of moisture conditions.

Laminated beams, girders, and stringers are now built up of thin pieces of lumber bolted together and used for structural purposes in the same manner as solid timbers of the same cross section. Tension members in truss design and, in fact, entire trusses have also been built up

and more accurate knowledge of the mechanical and physical properties of wood and of the materials and methods essential in perfecting built-up construction is stimulating interest in its commercial possibilities. The knowledge gained through intensive research during the war relative to making glues of great strength and moisture-resistance and relative to methods of conditioning and protecting wooden laminations or parts has turned attention to the possibilities of the exterior use of built-up wood.

A second factor is the regional depletion of forests and the necessity that manufacturing plants in those regions resort to closer utilization of the remaining timber. Experience has shown that in such localities utilization becomes increasingly intensive, while the price of lumber likewise increases, thus permitting forms of utilization involving increased cost to manufacturers. Closely allied to this factor is the decreasing supply of large-sized timber from which solid beams or timbers in structural sizes can readily be obtained. War demands emphasized only

too clearly the increasing scarcity of high-grade structural timber and the necessity of providing built-up substitutes that will be practically as serviceable as the solid material.

A third factor—now more potential than immediate in its influence but which in the long run will undoubtedly exercise great pressure—is the growing economic necessity of making the national wood supply go further by utilizing material now wasted and by adopting more economical forms of construction and use.

The airplane exemplifies more than any other one thing the possibilities of built-up wood. It represents accomplishment under the propulsion of necessity and intensive application. During the early days of the war and, in fact, even after America's entrance, it has been

the early years of the war, the advantages of such beams became so apparent towards the end of the war that several of the Allies specified them to the exclusion of solid beams. While there are at present no glues available that are equal to wood in tensile strength, it is possible to join wood so that it will resist tension satisfactorily by making long scarf joints, the area of which is much greater than the cross-sectional area of the pieces to be glued. Likewise, scarf joints are used satisfactorily in beams, where both tension and compression stresses must be resisted. There is, of course, more wastage of material in the scarf.

It will be apparent that the solution of the problems involved in aircraft manufacture has general application in many other directions and the successful development of glued-up wood for exterior use under exacting aircraft requirements forecasts with seeming certainty its ultimate application to the diversified wood-using industries. There is, however, one very vital problem not encountered in airplane manufacture, and that is successful protection against bacteria, to which glued joints are now particularly subject, especially when exposed to conditions of dampness. Recent experiments, however,



BUT LITTLE IS KNOWN AT PRESENT CONCERNING THE EFFICIENCY OF BUILT-UP AXLES AND BOLSTERS SUCH AS THOSE SHOWN IN THE ILLUSTRATION. THEY WOULD UNDOUBTEDLY BE STRONG ENOUGH TO DO THE WORK EXPECTED OF THEM, BUT NO DATA IS AS YET AVAILABLE TO SHOW HOW MUCH RESISTANCE THEY WOULD HAVE AGAINST EXPOSURE TO THE WEATHER AND THE SHOCKS INCIDENT TO USE.

said that 80 per cent of the French propellers had to be rejected before use because strains and stresses in the wood brought about by changing moisture conditions had rendered them practically useless. The propeller probably represents the most refined requirements of glued-up wood from the standpoint of manufacturing practice. It is essential that the propeller be so perfectly manufactured and finished that changing weather conditions will not pull it apart, weaken it, or even throw it out of balance or trackage to an infinitesimal degree. By the close of the war, these difficulties had been largely overcome through intensive studies of glues, protective wood finishes, and the effect of moisture upon wood.

The wing beam of an airplane illustrates another major problem in the use of glued-up wood because it must meet very precise strength requirements. Despite this fact, it was found by experiments that laminations of spruce, glued-up with strong waterproof glue, made a beam which was equal in strength requirements to a solid beam of the same dimension. The United States, England and France had actually approved such beams in their specifications. While laminated beams of many different designs were used to a limited extent by Germany and the Allies during



IN THE MANUFACTURE OF LAMINATED BOWLING PINS THE MATERIAL OF THE PROPER SIZE AND KIND IS FIRST SURFACED ON TWO SIDES AND THEN GLUED UP INTO A BLOCK AND SET ASIDE FOR A WEEK OR LONGER TO ENABLE THEM TO REACH A STATE OF EQUILIBRIUM.

have yielded results which indicate quite conclusively that it is possible to make a glue which will be both waterproof and bacteria-proof without decreasing its strength properties.

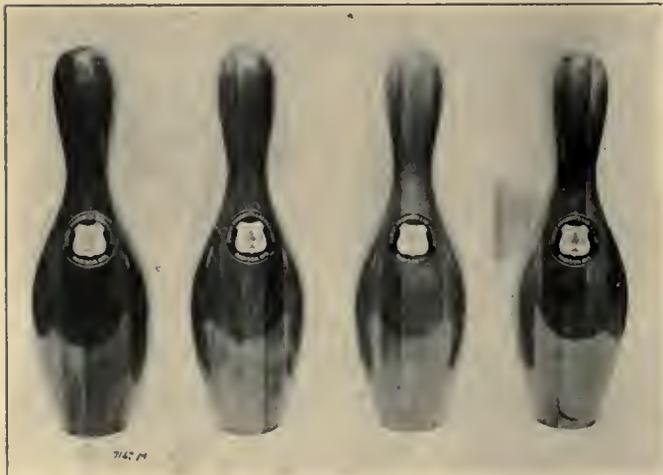
The successful use of large built-up columns, trusses, and structural timbers of similar character is more uncertain, on account of the difficulty of designing satisfactory joints and fastenings to meet the tremendous strains to which they must be subjected. Another problem attending their use is the shrinking of the wood after they are put in place and the consequent loosening of bolts and joints. Further refinements in drying practice, however,

should go far toward solving this difficulty. In the experiments now under way to determine the possibilities of various built-up forms for heavy structural use and the efficiency of different types of joints and fastenings, glued laminations are not yet being used, although it is not improbable that when the effect of aging on the strength of glue becomes definitely established, glued joints may find structural application.

For smaller wooden articles, built-up wood has immediate application not only in replacing solid material but in extending the utilization of small sizes and low grades. Some of these possibilities are for wagon tongues, bolsters, wheel hubs and rims, plow beams, sled runners, automobile bodies, gun stocks, agricultural implements, athletic goods, artificial limbs, hat blocks, ladder rails, shoe lasts, porch columns and outside doors. The Laboratory has already made up as experiments sets of maple bowling pins and shoe lasts, oak wheel



IN THE MANUFACTURE OF LAMINATED BOWLING PINS THE BLOCK HAVING BEEN ROUGHED OUT ON THE BAND SAW IS PUT IN THE TURNING LATHE AND TURNED TO THE PROPER PATTERN. AFTER A SUITABLE FINISH HAS BEEN APPLIED THE PINS ARE READY FOR TEST.



LAMINATED BOWLING PINS READY FOR TEST. THE TEST CONSISTS OF ACTUAL SERVICE IN A BOWLING ALLEY, A RECORD BEING KEPT OF THE NUMBER OF GAMES PLAYED WITH THE PINS.

rims, wagon bolsters and tongues and walnut gun stocks. These articles are now made commercially from solid wood, but the experiments are in laminated construction, with the use of waterproof casein glue in some cases and blood albumin in others. The bowling pins, under actual preliminary test in a local alley at Madison, gave the same service as the solid pins. The testing of the other laminated articles has not yet been completed.

While the field for laminated construction of the foregoing character is very extensive, the factor of com-

mercial practicability will undoubtedly time its widespread or general adoption. As a manufacturing process, laminated construction is in a great many cases more expensive than solid-wood construction, and there is an element of waste in the large amount of saw kerf. It would appear offhand that, so long as present differentials in the prices of thin and thick lumber and in various species prevail, built-up wood will have great difficulty generally in meeting competition. But this is not altogether the case and for the following reasons:

1. The drying or seasoning costs are lessened by laminated construction since thin lumber can be much more rapidly dried and with less loss than thick lumber.

2. The manufacturing loss in solid wood, especially where steam bending is required, as in wheel rims and certain kinds of furniture, promises to be very greatly reduced by laminated construction.

3. Scrap ends and waste material may often be fully utilized in built-up wood.

4. In the manufacturing of certain articles now requiring select high grades, low grades obtained at cheaper prices may be substituted.

5. Built-up wood makes possible better and more uniform seasoning of stock, and this in turn, makes possible a more serviceable article and tends to eliminate price competition.

6. The location of the nation's main sources of timber supply in the far West will tend to make possible the local utilization of built-up wood from other species in eastern and middle



AFTER 250 GAMES THESE LAMINATED BOWLING PINS ARE STILL IN SERVICEABLE CONDITION. IN FACT THIS PARTICULAR SET IS, TO ALL INTENTS AND PURPOSES THE EQUAL OF SOLID PINS.

western regions, at prices comparable with or even below those of solid wood shipped in from distant regions.

These conditions, it will be apparent, will have a direct bearing upon the final costs of built-up wood. It is

significant that even under the price conditions existing today a suprisingly large number of laminated articles, by efficient utilization and manufacture, is being produced and marketed in competition with the solid form of construction.

Another factor with which built-up wood will have to contend for its general adoption is that of buyers' prejudice or custom. Custom has a strong hold upon the average person, particularly the rural citizen, in relation to the tools and equipment which he uses in his work. The average farmer, for example, will have to be shown that a laminated wagon tongue or bolster is serviceable and "worth the money." In the immediate development of markets for built-up wood intended to replace solid wood, price competition will, therefore, be necessary to establish the serviceability of many articles.

To the average forester and lumberman a general transition to built-up wood probably appears far distant or doubtful. The limits of its commercial practicability are, to be sure, indeterminate and problematical, but, from the standpoint of satisfactory service, there seem to be no limits to its possible substitution for most forms of solid wood. Even built-up railroad ties and telephone poles, while extreme examples, are by no means beyond the realm of possibility. Further research may be counted upon to make available glues that will be absolutely impervious to moisture and bacteria, and to determine accurately the factors of safety for all different types and forms of built-up wood. It will then become possible to use it with intelligence, economy, and safety. One cannot fail to be impressed by the possibilities of built-up wood as a factor of utilization. Not only would it make possible the saving of a large percentage of present woods and mill waste, but conceivably it would revolutionize beneficially the present milling and grading practices for many species. Select and clear material, the value of which is now lost in under-sizes or discounted by low grade classification, could be utilized and valued on the basis of the number of clear cuttings produced, the method being somewhat the same, only far more intensive; as that now used with the more valuable hardwoods and shop grades of softwoods. This general practice

would, in turn, stimulate similar refinement in stumpage valuation and would go far toward valuing the tree on its actual contents of clear material. In brief, the influence of defects upon surrounding clear material would be reduced to an almost negligible minimum, while milling practices would automatically be adjusted to an intensive manufacture either of small-dimension material for laminated manufacture in the wood-using industries or to standardized built-up, ready-to-use building lumber for the retail trade, or both. Furthermore, other species of wood now more or less unusable could be brought into use—eucalyptus, for example, because of the practicability of drying it satisfactorily in small dimensions.

A general utilization movement of the intensiveness suggested above would naturally exercise a direct influence upon the practice of forestry. Instead of managing timber lands on long rotations, the raising of young forests under short rotations would be practicable, and foresters in working out their silvicultural plans would give special weight in the selection of species to their economic value for laminated or built-up use. Short rotations, in most instances, mean greater quantity production, higher financial returns from forest investments, and enhanced soil values, while a wider range of species utilization, which laminated construction makes possible, would tend further to increase quantity production.



TWO TYPES OF LAMINATED SHOE LASTS ARE ILLUSTRATED IN THIS PHOTOGRAPH. THE UPPER LAST IS MADE WITH VERTICAL LAMINATIONS AND THE LOWER ONE WITH HORIZONTAL LAMINATIONS. THESE LASTS ARE USED IN THE MANUFACTURE OF SHOES AND RECEIVE A MUCH HARDER SERVICE THAN THE ORDINARY SHOE TREE. THE SOLID LASTS ARE USUALLY MADE OF MAPLE AND BIRCH AND THE LOSSES INCURRED IN THE SEASONING OF THE BLOCKS AND THE MANUFACTURE OF THE LASTS ARE NORMALLY RATHER GREAT. SEVERAL SHOE FACTORIES ARE COOPERATING WITH THE FOREST PRODUCTS LABORATORY IN TESTING OUT THE SERVICEABILITY OF THE LAMINATED LASTS. WHILE NO DEFINITE RESULTS HAVE AS YET BEEN OBTAINED, PRESENT INDICATIONS ARE THAT LAMINATED LASTS, BUILT UP WITH WATER-RESISTANT GLUES WILL BE QUITE SATISFACTORY.

and utilization standards, but built-up wood would largely remove that difficulty by making practicable comparatively short rotations for all species and the greater utilization of quick-growing and so-called inferior species now discredited with the trade and of low commercial value. It would, therefore, transform many now unattractive forest projects from unprofitable to profitable investments and stimulate the practice of private forestry in all parts of the country.

The utilization of young forests naturally raises many questions relative to seasoning, durability, mechanical properties, etc. One is apt to think that it will intensify drying difficulties on account of the increase in percent-

age of sapwood, but such is not the case. On the other hand, sapwood simplifies the drying problem because of the fact that it dries more easily and better than heartwood. Likewise, the sapwood of most species, excepting that of hemlock, white spruce, and certain fir, takes preservative treatment better than heartwood, although it is not probable that this greater penetration will give greater durability than well-treated heartwood. While in the case of most hardwoods, second-growth young timber is superior in strength quality to older or mature timber, this is not true for all conifers. In fact, the reverse is more nearly the rule, but the differences are not too great or serious to be met satisfactorily by developing methods and standards of laminated construction in accordance with which the required strength for specific purposes will be obtained.

From the broad standpoint of forest conservation, built-up wood justifies thoughtful public and professional consideration. The tremendous annual loss to the nation of wood wasted under present methods of logging, milling and manufacture, is like the weather; it is much talked about but relatively little is done about it. For every foot of wood utilized we have to admit that two feet are wasted in woods, mill and factory. At the same time lumbermen admit that ten years hence the remaining large bodies of southern pine will be cut out. The country's main storehouse of timber will then be the west coast, two to three thousand miles removed from the principal consuming markets of the country. When that comes to be the case, the East and Middle West will begin to feel the full effect on the price of lumber generally of a transportation cost of from \$10 to \$20 per thousand feet. Furthermore, public measures making mandatory the more economical utilization of our forest resources may be expected in a relatively few years. It is, therefore, wise and forehanded to determine in the meantime the directions along which a sane and sound national utilization policy for the future may be shaped.

"NAPOLEON WILLOW" DYING

HEAVERY with memories of Napoleonic glory and whispers of quiet St. Helena, the old tree which came from the aisle of willows at the Emperor's grave some forty years ago as a slender shoot to be transplanted to the Woodside estate of John Morris Phillips is dying. Today it is in the care of the city of Newark, part of the little park at Elwood Place which the Phillips estate presented to the city in 1892, and tree surgeons are busy on the tree, with cement for the gaping cavity at the base of its trunk and all the remedies known to science. But the willow, which has aged early, is world weary, and its wide, drooping branches are symbolic of a fast and steady decline.

In the days when the old Phillips estate, which holds a place in the city's history for 200 years, dominated the Woodside section with its twenty green acres. John Morris Phillips, lover of beautiful trees and shrubs, took delight in putting out new ones from his fine nursery. Besides trees, he had another enthusiasm—Napoleon



Photograph by courtesy of the Newark Evening News

THE FAMOUS "NAPOLEON WILLOW" AT ELWOOD PLACE
The photograph shows the dying branches on the wonderful old tree.

Bonaparte. Fine prints of the little Corsican, memoirs and documents galore bearing upon his career, were stored up at the Phillips' homestead in a collection that never seemed to stop growing. But one day there came an incident that combined the two loves of John Morris Phillips—a friend of his who had gone on a trip around the world had stopped off at St. Helena and there taken a shoot from the clump of willows that surrounded the great exile's original burial place.

The young tree was duly set out on the broad lawn facing Elwood Place, and from that time on it was the favorite of old Mr. Phillips. Set in among the elms and maples in what is now a city park, it is still the aristocrat of the lawn. Thirty-five years ago Mr. Phillips died, and the estate today is not of the size that it used to be. Neither have the same understanding hands that cared for the willow been there to care for it in the old way, for the Napoleonic tradition died.

City officials may worry about it—Carl Bannwart of the Shade Tree Department has ordered that it be given special care—attendants may potter around at the broad base of its trunk, and the curious may speculate, but the willow of St. Helena is dying.

TREES AND THE HIGHWAYS

BY PHILIP P. SHARPLES

ROAD ENGINEERING EXPERT OF THE BARRETT COMPANY

A MAN from New England carries through the length of his life a picture of a village street with high arching elms overhead beneath whose grateful shade he was wont to linger on his way from school in the first hot days of June. The elm is still there and ever will be the most attractive tree for highway planting.

Highways are built not for today, but for tomorrow in a long vista into the future. It behooves the engineer of today to look ahead. He can lay out a highway in the most approved fashion and put upon it a surface adapted to the traffic of the minute, but in the end the only permanent part of the way is the location and this our experience tells us is likely to be handed down through the generations to come.

What more fitting gift can we bestow upon posterity than the chance to enjoy roadways well located and lined with noble trees!

The details of tree planting require the co-operation of the engineer, the landscape architect and the forester. Rare is the man who combines the talents of all three and the majority of trees must be planted on an experience and common sense basis.

The engineer must determine the width of the road and the likelihood of change so that the trees may be placed where they will not be disturbed in the future. It is also up to him to tell if there should be planted trees of varieties that give dense shade, or, if such trees should be placed only on the north side of the road, for there are road locations that require sun and warmth to keep their surfaces in traversable condition the year through. It may be necessary in swampy forest locations to ruthlessly cut the trees away from the sides of the road to prevent too much dampness.

The landscape architect must decide the most effective placing of the trees, not alone for the present, but, with his imaginative eye, for the future. He must also

decide the kind of tree suited to the view and to the surroundings. Elms may be desired or a quicker growing tree like the maple or the linden. A swampy soil may call for the weeping willow or swamp maple. His problems are numerous, from the placing of an elm in New England to the designation of eucalyptus and palms in southern California. He may even throw up his hands and tell you that neither the giant cactus nor

the live oak will thrive and there can be no successful planting without irrigation. The Lincoln Highway has miles and miles of these problems in Nebraska, Wyoming, Utah and Nevada. Nothing but sage brush grows and yet even that, as vegetation, has a charm in the desert.

The landscape architect has other subjects than trees to consider and, perhaps, the time is not far distant when shrubs and flowers may be considered for our roadsides in our more settled communities.

The hawthorne hedges and the roadside gardening of old England are examples for the future. The possibilities in this country are not indicated in the park work of our larger cities.

The forester (and the arboriculturist is included) must indicate the kinds of trees suited to soil and locality, which ones will stand drouth and which ones water. He must indi-

cate the kinds that must grow in groups for self-protection and which ones can stand alone battling the winds, a sentinel and a landmark on some commanding hill. He too must devise the plans for transplanting and must attend the nurslings until they are established and care for them in the future.

In contemplating the future, let us not forget to save and cherish what we already have. The engineer should attempt to save the noble specimen on a new location, the landscape architect should attempt to utilize foliage already on the location and the forester should attempt



THE MONARCH OF FOREST TREES

Redwoods on the California State Highway, near Miranda. As Mr. Sharples says, the reconstruction of the battle areas in France is an easy task compared to replacing such trees as these.



ON THE WILLIAM PENN HIGHWAY, NEAR YELLOW SPRINGS, PENNSYLVANIA

This gives a good idea of what needs to be done to make our motor routes "Roads of Remembrance." Note the most unattractive stretch of barns and telegraph poles on the right of the road.

to save for the future what our ancestors have left us.

The national forest reservations are a wonderful step in saving for the future some of the beauties nature has bestowed upon us. More must be done. The great state highway project should be made to mean more, and in building such highways advantage should be taken of natural beauties that can be preserved.

In Humboldt County, California, a new state highway is in process of construction. It is flanked with noble redwoods dating from before the time of Christ. Unless public sentiment bestirs itself, the trees along this great aisle of the cathedral of the woods are doomed to the saw and the mill. The man-made buildings destroyed in devastated France are easier to restore than one of these ancient monarchs of the forest.

The problems of tree planting and tree saving have only been briefly touched upon. It is to be hoped that the example of France and England may not be lost on our soldiers who have been across and that we may

look forward to roads and streets better kept and more artistically treated.

THE COMMUNITY AND ROADS OF REMEMBRANCE

POSSIBILITIES of highway tree planting pointed out by Philip P. Sharples in the article are only limited to the number of miles a road may extend. The community spirit that was reborn of the war may, with the planting of "Roads of Remembrance," be kept alive and bring about a more united country. The great burden of our roads is civilization. A striking example of what may be done is seen in the plan worked out at Dryden, Michigan, by Major-General George O. Squier, chief signal officer of the United States Army. The General took a green scum covered mill pond and converted it into a beauty spot by building a miniature dam. A small club house was erected on the side of a hill. The General demonstrated right in his own home town that the beauties of a place are seldom seen by the people who live there. The result was that the little club house has become a real country club and it is the meeting place of the farmers of that county. The boys and girls of the farm community now enjoy this interesting place. Let our good roads program include such community centers and the planting of memorial trees such as General Squier is going to have planted at his home town and we will shortly have a transformed farming community.

Nearly every State in the Union is alive to these possibilities and various organizations are backing plans for memorial drives and victory highways. The Rotary Club at Bluefield, West Virginia, is one of the first branches of that organization to plan a memorial drive



A BEAUTIFUL STRETCH OF ROAD AT TOPSFIELD, MASSACHUSETTS

This shows the wonderful possibilities for Memorial Tree planting along the good roads now under construction. Compare this picture with that of the William Penn Highway in Pennsylvania.

although the Detroit Rotary Club has planted memorial trees for its members. The Rotary Club of Hamilton, Ohio, is going in for tree planting as a memorial on an even bigger scale for that organization will plant memorial trees for the soldiers of Butler County. Perhaps one of the most unique forms of hearty response to the call of the American Forestry Association for memorial tree planting is found in the *Burroughs Clearing House* magazine. This publication, which goes to the banks and bankers of the country and is devoted to office management and efficiency, gives a full page to "Roads of Remembrance" and urges the bankers of the country to visualize the possibilities for a better country and better business in the building of good roads and their beautification.

Frederick Stuart Greene, State Commissioner of Highways for New York, has outlined a plan whereby his department will plant fruit and nut bearing trees along the roads. On this point Commissioner Greene says:

"The productive fruit or nut from these trees would be ripened at just about the time we now lay off our patrolmen or repair gangs and instead of laying these men off they could be used to harvest the crops which the trees produce and with the number of trucks which the government is now turning over to the department these crops could be quickly and economically transported to markets.

"The yield from trees planted along our highways represents but a small part of their value to the State. There are few things we can do toward lengthening the life of a road more effective than the planting of trees so that the pavement is shaded. On some of our mid-summer days it is not unusual to find a temperature of from 115 to 125 degrees on the pavement itself where it is subjected to the direct rays of the sun, whereas the same pavement under the shade of a tree will show at the same time not more than 90 degrees of heat.



By American Photo Service.

PERSHING PLANTS A MEMORIAL TREE

One of the first things (after the cheering) when General John J. Pershing arrived in New York from over seas, was the planting of a memorial tree in Central Park. This pin oak from the Amawalk Nursery was planted as a memorial to the men who lost their lives in the war. The General also planted a memorial tree in Independence Square, Philadelphia.

"It is during these hot days that we most frequently get our sudden showers. The temperature of the water from one of these showers runs from about 65 to 70 degrees. On an unshaded pavement we have, therefore, a sudden drop in temperature from say 120 degrees to 65 degrees, or 55 full degrees. On a pavement protected

by the shade of trees we have a drop of from 90 to 60 degrees, or a total of 30 degrees, just one-half the change in temperature of an exposed pavement.

"The stress and amount of shrinkage set up in a pavement which is subjected to the sudden change of 55 degrees are a detriment to any type of road. Further than this, with an unexposed pavement this sudden change in temperature is more gradual, due to the fact that the leaves of the trees retard the water to some extent and the pavement does not get the full rainfall at one blow."

The soldiers, now back from France, are the strongest advocates of good roads for they know their value as perhaps no other one set of men know it.



WHAT LARGE MANUFACTURING CONCERNS CAN DO IN MEMORIAL TREE PLANTING

This picture shows the avenue leading to the works of Henry Disston & Sons, Inc., of Philadelphia. The management planted this avenue of Norway maples twenty-three years ago. Why cannot every manufacturing plant in the country plant a memorial avenue in honor of their men who offered their lives to their country?

This point of view is told in the *Amorac News*, which was published by the American Army of Occupation at Coblenz in these words:

"The most urgent necessity of our country is good roads—permanent roads that can be used twelve months in each year. The roads of America today are absolutely inadequate, inefficient, and antiquated. They are not designed to carry heavy traffic. It is a vital problem, this question of good roads, one that reaches down into the very foundation of our social and economic scheme of life, for roads are the clearing houses for the various States and the only means of free travel. Our national

municipalities have planned their own memorial highways or victory drives. In St. Albans, Vermont, for example, a memorial avenue a half mile long has been planted by the Woman's Club. At Bridgeton, New Jersey, a drive has been planted with trees in honor of that town's heroes. These tree plantings are being reported to the American Forestry Association for registration on the National Honor Roll of trees the association is compiling. Street tree planting has been taken up anew and a fine opening for the community spirit is found in the neighbors along a street or a block getting together and deciding to beautify their surroundings. The movement

1917 -- WORLD WAR -- 1918

The memorial tablet is rectangular and contains the following elements:

- Top Left:** A rectangular box labeled "SCHOOL HOUSE".
- Top Row:** Four stars with names: CORP FRANK McNAMARA, JOHN CONNELL, EARL KEARNEY, FRANK KEARNEY.
- Second Row:** One star with name: FRANCIS CARBERRY; one star with name: S'GT FRANK D.V. COUGHLIN.
- Third Row:** Two stars with names: ALFRED KEARNEY, JOSEPH J. KEARNEY.
- Center:** Two photographs: an oval portrait of a woman (Mrs. Annie Lavery Raycroft) and a rectangular portrait of a man in a military uniform (Lieut. Francis Tracy).
- Right Side (below photos):** One star with name: LIEUT. FRANCIS TRACY, KILLED IN ACTION.
- Bottom Row (left side):** One star with name: DANIEL MAHONEY; one star with name: LIEUT. URBAN LAVERY.
- Bottom Row (right side):** One star with name: LIEUT. PAUL LAVERY.
- Bottom Row (far left):** One star with name: CLARENCE KINGSTON; one star with name: ARZIE GILLESPIE; one star with name: CLARENCE MILLER.
- Bottom Row (far right):** One star with name: SIDNEY E. HARVEY; one star with name: LIEUT. JAMES F. LAVERY.
- Bottom Left:** A compass rose with cardinal directions: W (West), S (South), N (North), E (East).

ACADIA SCHOOL

This bronze tablet (without the picture inserts) is one of the most unique memorials marking memorial tree planting in the United States. The tablet hangs in the Acadia School, at Lavery, Pennsylvania, and each star on the tablet marks where, in the school yard, a memorial tree has been planted in honor of the former pupils. There is one star in gold, that of Lieut. Francis Tracy, who was killed in action. This tree is an oak. The others are maples. Lieut. Tracy was killed in the Argonne on his thirty-fifth birthday. The other insert, Mrs. Annie Lavery Raycroft, was chairman of the dedication committee. From all over Erie county hundreds came to the dedication.

prosperity demands that this disadvantage of roads be overcome. This can only be done by honest legislators making laws, the enforcement of which shall be placed in the hands of men who have passed the test, by service in the construction and maintenance of highways."

With nearly a billion dollars appropriated from one source or another for good roads the opportunity for beautifying these roads comes right now. The movement is well underway and growing every day. Many

has spread around the world for the American Forestry Association has just received word that New Zealand has plans under way for "Roads of Remembrance" following a meeting of borough council presidents and automobile officials called by P. J. Luke, the Mayor of Wellington. One road under discussion is between Wellington and Auckland, straight across the dominion. Take up the work in your community and start the movement going as a representative of the American Forestry Association.

THE LOONS AND GREBES

(Families Gaviidae and Colymbidae)

BY A. A. ALLEN, PH. D.

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

“AS crazy as a loon” is an expression that gains force when one hears the weird notes of one of these curious divers. Beginning low, the strange sonorous sound rises in pitch and increases in volume until it ends with a terrible spasmodic gasp. Heard in



Photograph by G. A. Bailey

A CAPTIVE LOON

This beauty is in summer plumage—in winter it is gray above.

the dead of night when one is alone in the silent forest it has the faculty of arousing one from slumber with a stiffened scalp and strange prickly feeling in the vicinity of one's spine. At other times a pair of birds will hold



Photograph by G. A. Bailey

LOOKS LIKE A SHADOW

But it is a young loon in its characteristic coat of soft black down.

a concert or a single bird will locate a rocky cliff where there is a good echo and will call to himself for hours at a time. The notes are then different and resemble more the insane laugh of an escaped maniac. Those who

spend their summers in Canada are familiar with the loons and their ways for it is impossible to camp by the lakes where they nest without being almost continually aware of their presence. Those who do not go to Canada or visit the lake country of northern New England, however, seldom see them. They may not realize that they are present in numbers during the winter on the larger bodies of water throughout the United States



Photograph by G. A. Bailey

THE HOME OF AN EXCLUSIVE LOON

Though fully exposed, this nest on the shore of Georgia Bay is safe. The eggs are inconspicuous because of their olive-drab color.

and along the sea coast, for at such times they are silent and usually keep a safe distance from the shore. On their migrations over land they usually fly high and, because of their large size and long necks, they are some-



A STERN WHEELER

Young grebes resemble their parents in everything but color. Note the lobed toes and the position of the legs at the head of the body.

tines mistaken for geese, but the flocks of loons never assume the characteristic wedge of the wild geese. Though occasionally there may be a hundred or more birds in the flock, they seem to care nothing for each others company but fly in scattered ranks.

During the winter all loons are colored much alike, being grayish above and white below but, during the summer, they are quite different. There are only five species of loons in the world, confined to the northern



"ALL ABOARD"

One young grebe is just crawling onto its father's back and the other is making haste to follow him.

half of the northern hemisphere, and only one of these, the common loon, is often seen. It is black above, the back spotted with white, and there is a half ring of white streaked across the neck. The underparts are white but as it is seldom seen except on the water, the general impression is that of a black bird about the size of a goose but with a shorter neck and a longer bill. The bill is very strong and sharply pointed for it is used for



ON THE BOSOM OF THE CAYUGA

A horned grebe on Cayuga Lake in winter plumage.

spearing the fish upon which the loon lives. The fish captured by the loon are usually small but some occasionally weigh as much as a pound or even two pounds

and these are swallowed with much difficulty. The fish are pursued by the loon and speared beneath the water, the strong webbed feet of the bird driving it at such speed that the wings never have to be used unless the



Photograph by A. D. DuBois

A HORNED GREBE AT HOME

All grebes build floating nests from which they can slip readily into the water and disappear.

bird is wounded. The fish are never swallowed beneath water but are brought to the surface and juggled about until they can be swallowed head foremost.

The loon ordinarily lays its two olive-brown spotted eggs in a mere depression on the shore, on a hummock



THE "HELL-DIVER"

Otherwise known as the pied-hilled grebe. Note the insignificant tail. It is a graceful bird on the water but almost helpless on the land.

of mud, or a muskrat house where it can quickly slip into the water and dive from sight. The young loons are covered with thick black down when hatched and almost immediately take to the water where they can swim and dive with the greatest ease. Campers often pursue the young birds with canoes in an effort to catch them but it is nearly impossible to do so as they can dodge very quickly and swim for long distances under water. Very often they dive deeply, turn about under the water and swim back under the pursuing canoe until they come up a long distance in the opposite direction.

The red-throated loon is the only other species found in eastern North America and it occurs within the borders of the United States, only as a winter visitant. In its winter plumage it resembles the common loon but is smaller and has the back spotted, rather than streaked with white. In summer plumage it is very different from the common loon as it has gray upper parts instead of



WHERE THE "HELL-DIVER" LIVES

The margin of a mill pond showing the nest of a pied-billed grebe.

black, and a chestnut patch on the front of the neck.

The black-throated loon is confined to northwestern North America and northern Europe and Asia and even in winter is a rare bird within the United States. A very similar species, the Pacific loon, however, is common along the Pacific coast throughout the winter. The fifth species is called the yellow-billed loon and it, like the black-throated species, inhabits the Arctic regions of western North America and eastern Siberia. It resembles the common loon but is larger and has a yellowish bill.

THE GREBES

(Family Colymbidae)

Closely related to the loons but different from them in many essentials are the grebes or, as they are popularly called, "the Hell-divers." There are twenty-five different kinds of grebes, found all over the world, and six of them are found in North America. All are smaller than the loons, being about the size of small ducks, which, indeed, they very



A CAMOUFLAGED CRADLE, THE NEST OF PIED-BILLED GREBE
Eight eggs lie concealed beneath the debris which the grebe pulled over them before leaving.



THE CAMOUFLAGE REMOVED
The conspicuous white eggs would now be quickly discovered by some hungry crow hence the necessity for concealment.

much resemble. They can always be distinguished from the ducks, however, by their pointed bills, short rounded wings, and their apparent lack of tails which are represented by mere tufts of feathers. Their feet, instead of being fully webbed as in the ducks and loons, are lobed, appearing as though the webbing had been cut between the toes. This does not seem to hinder their swimming or diving for they are fully the equals of their larger cousins, diving so deeply and remaining under for so long that they often seem never to come up. Indeed, when alarmed, they sometimes come up very quietly, letting only their bills show above the water and if there is a slight ripple on the surface they are entirely invisible. This has given rise to many stories of mysterious disappearances and to such popular names as "water witch" and "Hell-divers" already mentioned. When diving they

either dive head foremost with a flip of their feet or they settle backwards so carefully as to scarcely leave a ripple on the surface. Such expert divers are they that they prefer this method of escape to flight, especially as it seems to take considerable effort for them to rise. When they do take flight, they ordinarily patter along the surface for some distance before they are

able to get up enough momentum to lift themselves from the water. Once on the wing, however, they look a great deal like ducks because they carry their feet straight out behind them and these make up for the absence of tails which would otherwise be a conspicuous difference.

The commonest species of grebe is the pied-billed grebe, an inconspicuous brownish little bird even in its breeding plumage. It is found most often on reed bordered ponds and marshy lakes where it builds its floating nest, anchoring it to the reeds. The nest is but a pile of debris and looks like the little platforms that muskrats sometimes build to rest on. When the bird leaves the nest she always covers her eggs with some of the material of the nest, and, as she is seldom, if ever, surprised on the nest, it was once thought that pied-billed grebes did not incubate their eggs as other birds but depend upon the sun and the heat of the decaying vegetation to hatch

them. The eggs are white when first laid but soon become discolored. The young grebes, when first hatched, are curious little creatures, covered with down of a striped black and white pattern very different from that of their parents. They are able to swim almost as soon as hatched and follow their parents about the pond. When they get tired they climb upon the backs of their parents and in case of alarm, the old birds cover them with their wings and dive from sight, coming up among the reeds where they can easily hide. The pied-billed grebes are found in summer from British Columbia to Chile and Argentina, thus having one of the most extensive breeding ranges of any bird, and in winter they occur from Maryland southward.

Another common grebe is the horned grebe, so called from the tufts of yellowish feathers that decorate the sides of the head during the breeding season. In addition to these plumes, it has the neck, breast and sides a rich chestnut and the upper parts blackish, so that altogether, it is a much handsomer and more striking bird than the pied-billed grebe. In winter plumage, however, it lacks all of these bright colors and is merely gray above and silvery white below, the white of the under parts extending on to the sides of the head and making it a more conspicuous bird than it would otherwise be.

In its habits it is not strikingly different from its cousin, for it builds a floating nest and cares for its young in the same curious way. It is a more northern species however, nesting from northern United States northward to Alaska and wintering from the northern states to Florida.

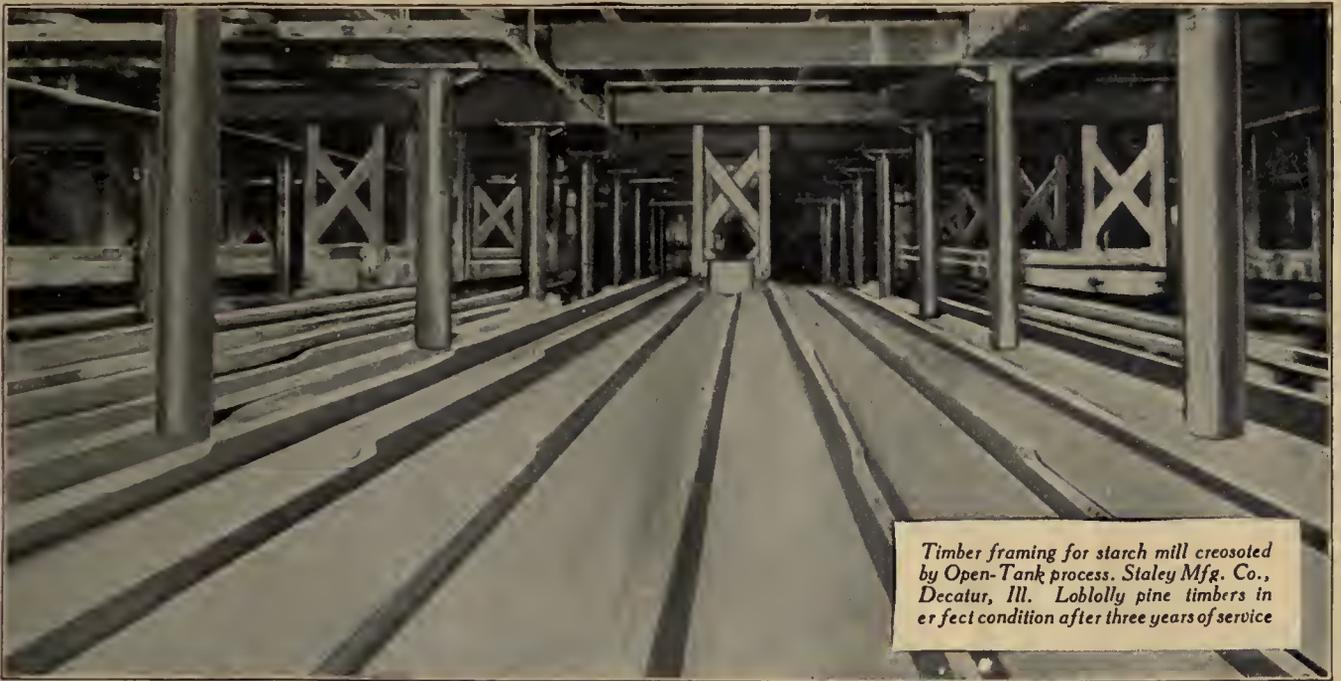
A third and larger species is the Holboell's grebe, a less common bird than the horned grebe, although it has about the same distribution. In winter plumage it is similar to the horned grebe but does not have such white cheeks. During the summer it is conspicuously different for the throat and sides of the head are pure white and it does not have the ear tufts. A somewhat smaller species

(Continued on Page 1424)



A WATER BABY'S FIRST SWIM

The proud mother grebe is swimming up to encourage her brave little youngster that has struggled from the nest shortly after hatching.



Timber framing for starch mill creosoted by Open-Tank process. Staley Mfg. Co., Decatur, Ill. Loblolly pine timbers in perfect condition after three years of service

A Lesson in Conservation—

A little over three years ago a progressive engineer saved thousands of feet of timber from the scrap heap, incidentally saving many hundreds of dollars, by using creosoted timber in a starch mill—an experiment looked upon as dangerous by other members of the profession.

The floor framing for the seven floors of the table house, consisting largely of 12" x 12" and 6" x 12" loblolly pine timbers, would not have justified the cost of laying alone because of its rapid decay under the prevailing conditions.

It was thought that creosoting the lumber *might* harm the starch. Nevertheless lumber creosoted by the Open Tank Process was employed. All details were properly attended to, and the result was a huge success.



The Open-Tank Process: Simple wooden tank (lined with sheet iron) equipped with steam-coils and small derrick. Upon expiration of the hot treatment, both oil and timber are permitted to cool instead of being transferred to a cold tank. Fence surrounding this plant has been creosoted.

After three years of use, a length of service which, untreated, this timber would not have given, all wood-work was found in excellent condition.



It was also found that the starch had not been affected the least bit by the creosoting.

Thus, Conservation and Economy were both served, and the non-pressure treatment, properly applied, again proved *worth while*.

Obviously, Carbosota Creosote Oil—the universal standard wood preservative for non-pressure treatments—was used.

(Green wood cannot be effectively creosoted by non-pressure processes. It should be air-dry. In regions of moist, warm climate, wood of some species may start to decay before it can be air-dried. Exception should be made in such cases and treatment modified accordingly.)

Similar opportunity for PROFIT by SAVING WOOD FROM DECAY exists in almost every industry. When building, request the advice of our experts which is obtainable gratis by addressing the nearest office.

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* This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.

THE LOONS AND GREBES

(Continued from Page 1422)

than the horned grebe, confined to western North America, is the eared grebe. It has the same yellowish tufts of feathers on the sides of the head but its neck is black instead of chestnut.

Another grebe of western United States is called the western grebe. It resembles the winter plumage of the horned grebe at all seasons of the year but it has a much longer and more slender neck. At one time the snowy white breast plumage of this bird was in great demand by milliners which resulted in the near extinction of this species, as well as the eared and even the horned grebes. The marshes and tule-bordered lakes of the West gave up thousands of these graceful birds to satisfy the dictates of fashion and for a time they almost disappeared. Now, however, they are protected, and, as one travels westward, he can gaze from the train windows and see them gliding over the surface of the reedy ponds and even catch glimpses of their floating nests or downy young.

TIMBER RESOURCES OF THE NORTHWEST

IF all the timber were cut into lumber and loaded on freight cars it would take 114,000,000 cars and 77,700,000 cars respectively to haul away the Douglas fir of Oregon and Washington, allowing the usual 30,000 feet of lumber to a car. Washington and Oregon contain one-third of all the standing timber in the United States. One-fourth of all standing timber in the country is Douglas fir and 80 per cent of the Douglas fir is in these two states.

The lumbering industry, including logging, sawmill operations and manufactured wood products is the largest single industry in Oregon and Washington and gives employment to nearly 60 per cent of the working population in the two states.

In Montana, a conservative government estimate places the standing timber at 65 billion feet, a large part in government forest reserves. At the present rate of cutting—300 million feet a year—it would take over 200 years to fell this enormous stand and as reforestation has already begun and methods of fighting forest fires are improving, there will be billions of feet of timber left in Montana at the end of the next hundred years.

DOUGLAS FIR AT ATLANTIC CITY

THE famous "board walk" at Atlantic City is being rebuilt of Douglas fir, replacing the planks of southern pine which have for two generations borne the weight of the gay habitues of the popular resort of the Atlantic seaboard, according to Secretary R. B. Allen, of the West Coast Lumbermen's Association. (*The Timberman*, June, 1919, page 109.)

THE FOREST POLICY OF FRANCE—ITS VINDICATION

(Continued from Page 1385)

advocate a wholesale transplanting of French policies or methods to the United States. Yet in many respects, what the French have done is strikingly suggestive of practical solutions of forest problems in the United States. Some of these will be discussed in greater detail in later articles. In considering them let us not forget, particularly in view of the re-awakening to the importance of our own for-

ests which the war has brought about, how the forest policy of France has vindicated itself in a crucial test of national strength.

NOTE:—THIS IS THE FIRST OF A SERIES OF ARTICLES BY LT.-COL. W. B. GREELEY ON FRENCH FORESTRY CONDITIONS. THE OTHERS ARE AS FOLLOWS: NOVEMBER, THE FOREST CODE AND THE REGIME FORESTIER. DECEMBER, THE CONTROL OF SAND DUNES AND MOUNTAIN TORRENTS. JANUARY, FORESTRY ON PRIVATE LANDS IN FRANCE.

FOREST SCHOOL NOTES

UNIVERSITY OF CALIFORNIA

AT the first regular meeting of the Forestry Club the following officers were unanimously chosen: president, George M. Gowan; vice-president, Landis J. Arnold; secretary, Willis M. Wagener; treasurer, Virgil Davis; sergeant-at-arms, Professor Emanuel Fritz.

Professor Mulford said a few words of greeting and welcome to old and new club members and reminded his hearers that forestry is "of age" as a science in America with the opening of this college year; the first instruction in the subject having been given twenty-one years ago.

"The very fact that the profession is of age," he said, "obligates all of us to strive for clearer thinking and more solid and adequate foundation work in research than ever before. People have a right to expect more of us and we must strive to measure up to those expectations." He predicted much better days ahead for foresters and forestry in general in spite of past and present discouragements and said he believed that the outlook for men going into forestry had never been better than at the present time.

Though only five years old and the youngest division in the College of Agriculture, the Forestry Division is now fourth in enrollment and but very little below Pomology which is next largest.

The club received from Hall and Ryerson two interesting mementos of their stay in France. One is the official badge of the French Forest Service today; the other, which is very rare, is the official badge worn by foresters during the reign of Napoleon.

Professor Bruce is at present on a field trip with Forest Examiner S. B. Show in connection with logging and mensuration studies in the Central Sierras.

UNIVERSITY OF IDAHO

DEAN F. G. MILLER, of the University School of Forestry at Moscow, Idaho, has just returned from Heybourne Park where he spent several days investigating timber conditions and forest cutting there. The trip was undertaken at the request of William J. Hall, State Commissioner of Public Works. A more extended reconnaissance is planned for next summer.

Heybourne Park was purchased by the state in 1909 from the Federal Government and comprises some 8,000 acres in addition to Chatelet Lake. It was dedicated to the people of Idaho.

Because of its accessibility, its wooded hills and lake, Dean Miller believes that it will soon become the playground of the Northwest.

Other members of the party were: W. I. Bassett, district engineer of the State Highway Department; M. H. Wolff, forest supervisor of the Coeur d'Alene National Forest; C. L. Billings, lumberman of the United States forest service; Judge E. F. Conklin, superintendent of the park, and E. C. Mohr, in charge of logging operations.

The purpose of the trip was to decide on a future policy for cutting timber.

UNIVERSITY OF MAINE

C. W. L. Chapman, a 1914 graduate of the Forestry Department of the University of Maine, has been appointed an assistant in the forestry school at Orono. Mr. Chapman has had both practical experience in the field and in teaching, is very highly recommended for his work and has also been in war work.

The school has had more applications for entrance than ever before in the history of the University, and it looks as if it will have the largest entering class. Many who dropped out during the war period are coming back to finish their work, so the prospects for the coming college year are most encouraging.

NEW YORK STATE COLLEGE OF FORESTRY

THREE developments of great importance to the New York State College of Forestry at Syracuse University have been announced on the eve of the opening of the college year of 1919-20. They are the inauguration of a department of Forest Recreation; the establishment of the Roosevelt Wild Life Experiment Station; the beginning of a series of practical forestry operations in the Summer Sophomore Camp at Cranberry Lake.

The three new departures are essentially different phases of forestry training, but are at the same time allied in some of their phases.

The department of Forest Recreation was determined upon by Dean Hugh P. Baker, of the College of Forestry, some months ago. Professor Henry R. Francis was selected as the head of the department, and to prepare himself for the work, and to secure data for the opening of the course he spent the summer months in a tour of the National Parks, traveling 8,000 miles by rail, 1,200 miles by automobile and 650 by horseback and on foot. In brief the new department will train men in the problems of proper utilization of forest areas for recreation, camping, hunting, fishing, summer camps for city people, tourists, and to help make the forests attractive in all phases which appeal to the vacationist.

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A Guide Book for Parents

A Standard Annual of Reference. Describes critically and discriminately the Private Schools of all classifications.

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Introductory Chapters review interesting developments of the year in education—Modern Schools, War Changes in the Schools, Educational Reconstruction, What the Schools Are Doing, Recent Educational Literature, etc.

Our Educational Service Bureau will be glad to advise and write you intimately about any school or class of schools.

Fifth edition, 1919, revised and enlarged, 786 pages, \$3.00. Circulars and sample pages.

PORTER E. SARGENT, 14 Beacon Street, Boston, Mass.

The establishment of the Roosevelt Wild Life Experiment Station is by authorization of the state legislature, and is the direct outcome of plans made in 1916 by Theodore Roosevelt himself. The functions of the station as specified by the new law are "to establish and conduct an experimental station in which there shall be maintained records of the results of the experiments and investigations and research work accomplished; also a library of works, publications, papers and data having to do with wild life together with means for practical illustration and demonstration, which library shall at all reasonable hours be open to the public." Other duties are to make investigations of the life, histories, propagation, management of fish, birds, game and food and fur-bearing animals and forest wild life. Quarters will be provided at the College of Forestry Experiment Station at Syracuse.

The work done the past summer at the Cranberry Lake Sophomore Camp as practical training in forestry has been developed along an entirely new line, one of great interest to the students, and of a real public value as well. In some respects it is allied to the new recreational forestry department, for the students were assigned the task of laying out trails toward different parts of the camp's 1,000 acre area, for visitors to use in getting to points of interest. These trails are two in number, as the first year's work and will be maintained properly inscribed with the class numerals of the Class of '21, as mementos of the summer work of this class. The trails will next year be continued into the distant depths of the forest, and eventually it is hoped to connect them with the state system of trails and highways.

This expansion in the field of the College of Forestry has been paralleled by the largest opening attendance in the history of the institution. The freshman class entering September 16 was the largest in the history of the College of Forestry, and was larger than the entire attendance in all classes during the year of 1918-19, depleted as was the college during that year by the war conditions.

Luis J. Reyes, of Manila, a Filipino Forester, has been sent to the New York State College of Forestry at Syracuse to take a college course in forestry.

Mr. Reyes comes to America as a special student sent by the Forestry Bureau of the Philippines, after six years service as assistant wood expert in that bureau. He is a graduate of the Forest School of the University of the Philippines and after graduation was made a member of the governmental bureau.

Of special importance is the fact that he brings with him 300 authentic samples of Philippine woods, comprising 150 species, giving the College of Forestry the most

complete such collection in the country. He is to specialize in microscopic study of woods, in the course in wood technology, as the use of the high-power microscope is of utmost importance in final determination of Philippine lumber.

"The need of the microscope is shown," said Mr. Reyes, "in the case of Tangile and Red Lauan. Tangile is worth 200 pesos a thousand, and is valuable for airplane propellers as is mahogany. Lauan, however, worth only 150 pesos, resembles Tangile so closely that though entirely unfit for airplane propellers, the microscope is needed to tell the difference. That is why the scientist, and the technical forester is needed in the lumber industry in the Philippines."

FOREST SERVICE OFFERS PHOTOGRAPHIC EXHIBITS.

NEW photographic exhibits on "Forestry and Nature Study" and "Farm Woodlands" may now be borrowed from the Forest Service, United States Department of Agriculture, by schools and libraries. The "Forestry and Nature Study" exhibit is a pictorial story of how trees grow, and of the buds, leaves, flowers, and fruits, the typical forms of trees, the different kinds of forests, and the influences that affect their growth, and the enemies and friends of the forest. The "Farm Woodland" exhibit, which is especially adapted for use in agricultural and rural schools, shows different types of woodland, how the farmer can use the woodland and sell the product, and how trees make waste land profitable and help the farmer in other ways. The exhibits are made up in panel form, each panel consisting of 4 sepia enlargements.

Teachers who are interested in the forests in a more general way will find what they need in the original photograph exhibits of the Forest Service, which show forest conditions in the United States, how the forests are used, and how they may be preserved.

For classes in manual training and the like there are exhibits of commercially important woods of the United States with explanatory charts and tables. Schools that have a lantern, or can provide one, may borrow sets of lantern slides with prepared outlines for lectures on many topics connected with forestry. For instance, there are sets on forestry in the United States, and on nature study, botany, manual training, geography and agriculture in relation to forestry, and on street trees and wind-breaks. Recently a set has been made up on recreation in the national forests. Lists of subjects and other details may be secured on application to the Forest Service, Washington, District of Columbia.

BOUQUETS

"I take this opportunity to congratulate you on the very great interest you have developed in the magazine and the great increase in scope which has been evolved in recent years. It is one of the most welcome periodicals which comes to our house."

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"It is gratifying to see so much forestry in the August number of AMERICAN FORESTRY."

K. W. WOODWARD.

"I was very much gratified to have the August number of your most interesting magazine, and want to congratulate you on its many entertaining and attractive features."

NELSON C. BROWN.

"The Magazine is certainly fine."

MARY J. CHUTE.

"I deem it a great privilege to be a member of the American Forestry Association, and derive great pleasure and profit from the magazine as well as many helpful suggestions for my forestry work."

MRS. ADELAIDE M. GODDING.

"I have given AMERICAN FORESTRY my careful investigation and I consider it an excellent magazine and will do what I can to have it placed in our High School libraries."

MISS A. F. BROWN.

"I enjoy your magazine, AMERICAN FORESTRY, very much."

COL. CHAS. H. CUMMINGS.

"The magazine is a credit to the Association and yourself. It is the most effective agency for keeping the forestry movement before the people."

SOUTHERN PINE ASSOCIATION.

"AMERICAN FORESTRY is used by all our students, but particularly by the younger ones in their school work. All that you claim for it is true and even more."

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PROF. LEW SARETT.

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Gentlemen: I felt it my duty to write you a few lines in praise of the work of your representative and men on several fine trees on the estate of Mrs. A. M. Booth, most especially the very fine work done on a grand willow tree, not quite two years ago.

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Yours truly,
W. G. WOODGER,
Garden Superintendent.

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Loss of this magnificent willow would have been irreparable. Note below how Davey methods have bound the branches together with rigid steel rods, and filled the cavities sectionally with concrete to allow for the swaying of the tree



FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

POSITION wanted by technically trained Forester; college graduate, 37 years of age and married. Have had seven years' experience in the National Forests of Oregon, California, Washington and Alaska. Also some European training. At present employed on timber surveys as chief of party in the Forest Service. Desire to make a change and will be glad to consider position as Forester on private estate, or as city Forester. Will also consider position as Asst. Superintendent of State Park and Game Preserve in addition to that of Forester. Can furnish the best of references. Address Box 820, care American Forestry Magazine, Washington, D. C.

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

An Opening For One Hundred Foresters

The position is that of Division Firewarden; the territory is approximately one-third of the State of New Jersey; the work is general administration of all forest fire matters together with attendance at large fires, investigation of the causes of fires, supervision of the personnel of the local firewarden service, about one hundred men, and responsibility for the publicity and propaganda fire prevention work in the territory. The compensation is \$1,200 to start, with every likelihood of increase shortly, the qualifications are that a man shall be a graduate or some reputable technical forestry school. The reason for requiring technical training is that advancement may be either in the forest fire work or in the technical forestry activities of the Department and in addition the incumbent is called on during the slack season for forest fire work, to do technical and propaganda forestry work in his territory. Apply Box 830, care American Forestry, Washington, D. C.

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, Care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, Care American Forestry Magazine, Washington, D. C. (1-3)

Man to be discharged from the Army September 30th desires position in forestry work, with lumber or railroad company or assisting in investigations of utilization of wood products. Would accept position in other work. Is married man, graduate of Michigan Agricultural College, 1913. Has had experience in orchard work, clearing land, improvement cuttings, planting and care of nursery, pine and hardwood transplants, orchards and larger trees, grading and construction of gravel roads, and other improvement work. Has executive ability and gets good results from men. Please address Box 860, care of American Forestry Magazine, Washington, D. C. (9-11)

FORESTER wanted as Division Firewarden in New Jersey. Must have professional training and some experience. Salary \$100 to \$120. Eligible for promotion to Assistant Forester. Civil Service examination can be taken after provisional appointment or by mail. Box 810, care American Forestry Magazine, Washington, D. C.

WANTED—Position as Forester and Land Agent. Technically trained forester, 35 years old. Practical experience along all lines included under the duties of the above positions. Former Captain, Field Artillery. Address Box 810, care American Forestry, Washington, D. C.

WANTED—Position with Lumber Company or Private Concern by technically trained Forester with five years practical experience. Box 820, care American Forestry.

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

THE Hon. Jules Allard, for ten years Minister of Lands and Forests of Quebec, has resigned. Mr. Allard has been Minister longer than any of his predecessors and during his term of office more progress has been made than in the whole previous history of the Department. The revenues from Government Lands have been materially increased, one of the most efficient fire protective systems on the continent put in operation, buying of lands by timber speculators has almost wholly been eliminated, improvements have been made in cutting regulations and much important forestry legislation been enacted. Mr. Allard is a man of broad views and deep interest in the progress and welfare of his country and his Province and everyone is sorry to have him relinquish his office. He remains, however, a member of the Legislative Council and will continue to use his influence and interest for the welfare and improvement of the Crown Forests.

Mr. Allard has been succeeded by the Hon. Mr. Mercier, for some time Minister of Colonization, which Department he has successfully conducted. He brings to his new office a wide knowledge of the Province from actual experience as he has traveled all over it and has seen the forest at first hand on many a hunting and canoeing trip. He is a man of energy and broad views and will take up and worthily carry on the work started by the Hon. Mr. Turgeon and carried on by the Hon. Jules Allard so successfully.

Mr. Piche, the Chief Forester, has had several parties in the woods this summer making studies of the quantities of timber in various districts, rates of growth, conditions on cut-over areas, prevalence of various insect pests and fungous diseases and so forth. Mr. Piche has done much valuable work since he became Chief Forester and it is hoped that he will soon let his confreres have the benefit of his researches through the medium of bulletins from his Department.

Mr. Clyde Leavitt, Forester of the Commission of Conservation, underwent a serious operation early in the summer but is now back at his desk again much improved in health.

The researches of the Commission of Conservation in cooperation with the Laurentide, Abitibi and Riordan Pulp and Paper Companies have been making good progress during the summer. New sample plots and subplots have been laid out,

those on the Laurentide Company's Limits now totaling 13 acres. Here a substantial camp has been built with facilities for all sorts of research work. Studies of rates of growth, meteorological conditions, rates of evaporation, insects and fungous diseases have been carried on. It has been found, for instance, that the daily rate of growth of trees is proportional to the temperature. The borer which is causing the death of the white birch has been thoroughly studied. Areas which have been burnt are being studied under different conditions to see which trees seed in first on them and why. Different methods of cutting are being tried on a small scale.

Contracts have also been made with the Logging Departments of the Laurentide, Abitibi and Bathurst Lumber Companies to cut sample areas of about 200 acres according to forestry methods, careful records being kept of the conditions before and after cutting, the cost of logging, brush burning and utilization of smaller sizes of wood and so forth.

Although there have been many difficulties to be overcome, chiefly the late start at the beginning of the season, the seaplane patrol of the St. Maurice Forest Protective Association has been carried on with a fair measure of success and the practicability of the work demonstrated beyond any doubt. The planes have flown all over the territory of 16,000 square miles without any difficulty whatever. Fires have been discovered, explorers for one of the constituent companies have been taken over the territory they wished to see, reports of the burnt-over and timber conditions have been made, etc. The planes have proved to be too large for gasoline economy as they use 20 gallons per hour. The ideal installation would be two smaller machines for patrol purposes and a large machine to carry to the scene of a fire a portable gasoline pump and hose, tools and three men. The experiment will probably be continued next season under the auspices of the newly created Air Board. The rest of the season will be spent in photographic work for making maps.

The fire season has been the worst in Eastern Canada for several years, owing to long continued dry weather. Few fires were reported from New Brunswick, Quebec suffered a little more than in the previous year and the losses in Ontario were very large. The problem of settlers starting clearing fires in Northern Ontario will



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THIS picture, taken in Central Park, New York City, shows the "K" HAND POWER STUMP PULLER used by the City Forester in removing hundreds of dead trees up to 38 inches in diameter and 40 to 70 feet in height, as well as stumps of all sizes. Without any preliminary digging, they were pulled out by the roots in a phenomenally short time, and the saving in labor quickly paid for the machine.

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Location.—Within the Kootenai and Pend Oreille National Forests, Montana and Idaho, in Sec. 19, T. 31 N., R. 34 W., M. P. M., and approximate unsurveyed Secs. 24, 25, 26, 35 and 36, T. 31 N., R. 35 W., M. P. M., Secs. 31, 33, and 34, T. 59 N., R. 3 E.; Secs. 3, 4, 5, 6, 8, 9, 10, 15, 16 and 17 T. 58 N., R. 3 E., B. M., Callahan Creek watershed.

Stumpage Prices.—Lowest rates considered, \$3.50 per M for green white pine and \$1.00 per M for dead white pine, \$1.00 per M for spruce, and 50c per M for other species; and special rates for cedar poles of various dimensions, piling, shingle bolts, cedar post material and cordwood. The removal of larch and Douglas fir saw timber, cedar posts, shingle bolts, and cordwood will be optional with the purchaser.

Deposit.—With bid, \$5,000.00 to apply on purchase price if bid is accepted or refunded if rejected.

Final Date For Bids.—Sealed bids will be received by the District Forester, Missoula, Montana, up to and including December 24, 1919. The right to reject any and all bids is reserved. Before bids are submitted full information concerning the character of the timber, conditions of sale, deposits, and the submission of bids should be obtained from the District Forester, Missoula, Montana, or the Forest Supervisor, Libby, Montana.

have to be met promptly and vigorously. The Prairie Provinces also suffered severely.

Dr. C. D. Howe has been appointed Acting Dean of the Forestry Department of the University of Toronto to take the place left vacant by the resignation of Dr. Fernow.

As Dr. Fernow was the Father of Forestry in the United States so he has been in Canada, and it is with the deepest regret that we see him giving up his active work among us. We wish him all sorts of good things in the retirement which he has chosen and shall ever remember the inspiration he has been to us and the great things he has done for forestry.

A party which has been making a survey of the areas in New Brunswick affected by the spruce bud worm, reports that practically all the balsam in that Province is affected and is dying. The spruce is only slightly attacked.

Mr. A. C. Volckmar, Forester of the Canada Paper Company, is making a reconnaissance of about two hundred square miles on the St. Ann River in Quebec.

It is reported that an aeroplane exploration undertaken by American interests in Labrador has proved a great success and that large areas of valuable timber were discovered. Confirmation of these reports and the size and amount of the timber will be awaited with interest as all previous explorers report timber only in the river valleys and that of small size.

A new saw for cutting down trees and cutting them up into logs is described in the Scientific American. It is electrically operated, the current being supplied by a portable dynamo driven by a gasoline engine. The saw is mounted on wheels and on a universal joint so that it can be set at any height or angle. Trees can be cut very rapidly and close to the ground. The set of the teeth is also novel and it is claimed that it operates very rapidly. In view of the increasing cost and decreasing efficiency of woods labor this should be thoroughly tried out and might prove of great advantage.

The Wayagamac Pulp and Paper Company have purchased a number of small caterpillar tractors and will try them in their logging operations this coming winter.

The Association of the Northeastern Foresters has decided to hold its next annual summer meeting at Grand'Mere, Quebec, as the guests of the Forestry Division of the Laurentide Company, Ltd. They will also be the guests of the Commission of Conservation at its Lac Edward Experimental Station.

ARBORISTS MEET

THE American Academy of Arborists, which suspended its meetings during the period of the war has renewed its activities, and is again prepared to disseminate the much needed scientific information on the planting and growing of trees, especially at this period of reconstruction.

The Academy held its first meeting in 1915, choosing for its object the advancement of arboricultural and landscape forestry and the maintenance of the highest professional standard among its members. Its membership is now extensively distributed throughout the United States, and at its last meeting it was voted to refer important inquiries on all tree matters to the nearest regional member.

After many interesting discussions on tree problems, the following resolutions were also unanimously adopted:

"I. Resolved, That the American Academy of Arborists endorses and strongly urges the planting of trees as memorials commemorating the heroes of the World War, but strongly advises the careful selection of species native and suitable for the location. In discussing this resolution the prevailing members favored the sturdy, long-lived varieties, characteristic of American ideals, and particularly discouraged the quick growing and weak varieties.

"II. Resolved, That the American Academy of Arborists endorses the name of the Federal Horticultural Board to prevent the further importation of plant pests but urges the representation on the Board of practical arborists and foresters.

"III. Resolved, That the American Academy of Arborists endorses the work of the American Joint Committee of Horticultural Nomenclature in standardizing scientific and common plant names for use of arborists and horticulturists and obligates itself to the use of these standardized names as published by said Committee."

It was decided to hold the next meeting in Washington on the second Saturday of January, 1920, and it was also decided to have some of the papers presented before the Academy at this meeting given out for publication.

GRAYS HARBOR COUNTY WILL CUT OUT IN 16 YEARS

APPROXIMATELY 1,000,000,000 feet of lumber was the output of the Grays Harbor County mills during the year of 1918, according to figures compiled in the office of the county assessor. The assessment rolls show that 414,295 acres of timberland remain to be logged in Grays Harbor County. The record last year was 26,364 acres cut over." (*American Lumberman*, August 16, 1919, page 70.)

This means only 16 years' cut remaining in one of the biggest timber producing districts of the Pacific Northwest.



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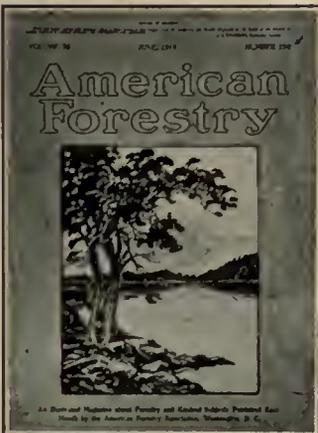
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STATE NEWS

CALIFORNIA

"THIS year for the first time the state of California is enabled to benefit by the terms of the Weeks Law agreement by reason of the appropriation made by the last legislature for the prevention and suppression of forest fires," says M. B. Pratt, deputy state forester. "Through the use of the federal and state funds, approximately three million acres of brush and timber land lying in the foothills of the Sierra Nevada Mountains outside the National Forests are receiving systematic protection through the employment of four experienced patrolmen.

"These patrolmen cooperate with the federal forest service and rural fire-fighting companies organized through farm centers by the county farm agents. They are provided with Fords and fire-fighting equipment for twenty men by the state which also authorizes them to incur fire-fighting expenses to the extent of their monthly letters of authorization. These salaries are paid by the federal government through the office of the district forester at San Francisco.

"The region covered by the Weeks Law patrolmen is one of great fire hazard due to the amount of inflammable material, intense summer heat, heavy winds and the large number of campers and hunters. Precipitation in California during March, April, May and June of this year was, according to Weather Bureau records, 27 per cent, 53 per cent, 74 per cent and 97 per cent respectively, below normal. Rain cannot be expected until the last of September which makes a long fire season and strenuous work for those engaged in fire protection.

"Since being appointed in July, the Weeks Law patrolmen have been almost constantly engaged in fighting fires some of which would have swept the Sierra foothills had they not been promptly suppressed. The region which they cover is patrolled daily by airplanes from Mather Field near Sacramento, and is under the eyes of federal lookout men in the adjoining National Forests as well. As a result, fires are promptly apprehended. The very bad fire conditions have made some of them difficult to control, and several have covered five thousand acres or more destroying young timber, watershed cover and ranch property. Reports to September 1st give a total of 30,000 acres of brush and timber lands burned over outside the national forests.

"The situation is not as bad as in Idaho and Montana since the country is well settled for the most part, and there are roads and trails from which to back-fire in ad-

vance of the main fire. The loss has been serious enough, however, to make people realize that the fire problem in California is a long way from being solved. The few trained men that are on the job in the Sierra foothill country have demonstrated to the local residents what can be accomplished by organized effort, and the way is being paved for better cooperation and a more efficient organization next year."

CANADA

A. V. S. Pulling, who graduated from the New York State College of Forestry, at Syracuse, New York, in 1915, has been secured by the University of New Brunswick at Fredericton, New Brunswick, for the position in charge of the Department of Forestry. At the outbreak of the war Mr. Pulling enlisted in the 504th Engineers, winning a sergeancy, and being sent overseas with his organization.

ILLINOIS

STATE Forester R. B. Miller has had an interesting trip with Ransom H. Kennicott, Forester for the Cook County Forest Preserves, through the preserves, traveling by auto for an entire day without covering the entire chain of parks belonging to Cook County. Mr. Kennicott is confronted by the question of recreation and along this line is building roads, dams and drinking fountains and driving wells to secure drinking water for the campers and vacationists who are constantly seeking these wooded areas for health and enjoyment. On one park, the Deer Creek, he has two or three Boy Scout camps under competent direction and a Fresh Air camp, for Chicago children. The entire chain comprises 12,353 acres of forest and woodlands and on some of these he plans to maintain forest conditions and raise timber. On the Desplaines river he has also started a forest nursery of considerable size, in charge of "Bill" Johnson, of Syracuse University, who has surmounted many difficulties in the raising of seedlings. It takes a formidable force of rangers, guards, road builders, and others to look after the comfort of the public, as well as several district foresters, and Mr. Kennicott is happy in looking after all of the various projects and looking out for the comfort of his many guests.

About six miles east of Polo, Illinois, on the east side of Pine Creek, a tributary of the Rock River, in Ogle County, Illinois, is a unique white pine stand, the origin of which is unknown. Here is a fine tract of white pine resembling the finest stands in Pennsylvania or Connecticut, occupying about 150 acres. The diameter of the trees

varies from 10 to 24 inches and the height is from 75 to 80 feet. According to Wesley Bradfield, who wrote a short report on this tract some years ago, the number of trees in the two groves is 1,017 and their total volume is about 245,000 feet. According to H. DeForest, a graduate of the Yale Forest School now making a report on the flora of Ogle County, the grove is unique in that the succession is from oak to white pine rather than from white pine to oak, the ordinary succession. There is a strong local sentiment in favor of making "The Pines" a forest reserve which would be a very good way of preserving a beautiful and rare tract of native timber, one of the few in Illinois. The stream, Pine Creek, has been stocked with bass and down near the stream there is an ideal camping site. A map of the site will be found on the Dixon Quadrangle of the Illinois Geological Survey.

Governor Lowden, of Illinois, has been an enthusiast for several years in forest and ornamental planting and at his farm, "Sinnissippi," three miles from Oregon, Illinois, can be found white pine and Scotch pine plantations fifteen years of age down to recent planting, all doing remarkably well on sandy soil. Many species of hardwood trees are also growing successfully on this farm which will well repay a visit.

An informal meeting of much importance was recently held at the Quadrangle Club, in Chicago. Those present were Dr. John M. Coulter and Dr. Cowles, of Chicago University; Dr. Shepherdson, Director of Registration and Education, from Springfield, Illinois; Dr. Forbes, Chief of the State Natural History Survey Division and State Forester R. B. Miller. Among the things to be included in the work of the first year it was decided that a forest survey of at least one county was necessary, in cooperation with the soil survey and topographic survey; an investigation should be conducted showing the profit and loss from grazing in the ordinary wood lot; that demonstration forests similar to those in Ohio be established on a cooperative basis with farmers; that certain questions vital to a forest policy for the state be carefully looked up, such as state forests, state nurseries, fire protection plans and forest taxation; that the estimating of timber and the bringing together of buyer and seller was a legitimate work for the state forester to engage in and that so far as possible he should cooperate with the county advisers, through personal conferences and lectures, so as to bring forestry information to the people; in addition carry on publicity work through the press and by public lectures wherever possible. Co-

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By M. Ella De Voy: Silas S. Furbush.

COUNCIL BLUFFS, IOWA.

By A. M. Hutchinson: Honor Roll of Sixty-Four Members of the S. S. 2d Presbyterian Church.

ATTLEBORO, MASS.

By Attleboro Community Fellowship: Miss Ruth Holden, Howard C. Mattson, Charles F. Hall, Willard B. Hoyt, Jerome F. Gilbert, Edward J. Kelby, Arthur N. Crosby, Charles H. Fontneau, Herbert D. Parmenter, D. Emery Holman, Leroy C. Estee, Charles O. Fiske, Cyril M. Angell, Percy E. Cobb, Peter Boivin, Lloyd C. Inman, Albert H. Allen, Herbert O. Gilman, F. Henbert Ogilvie, Earle I. Brown, Joseph Perry, Edward Quintin, Chester E. Harding, Albert Larose, George F. Spencer, Earle A. Thayer, Harold V. Patriquin, Lincoln A. Smith, Lieut. Carlton M. Bliss, Harry Alterian, Joseph L. Ritchie, Harry L. Boyce, Elmer Gordon Baker, Ralph V. Kling, Lester L. Simmons.

HESSEL, MICH.

By Mr. James H. Rogers: Lieut. James T. Rogers, 2d.

BEMIDJI, MINN.

By L. F. Johnson: Lieut. Ralph D. Gracie.

OMAHA, NEB.

By United States Army Balloon School: James Owen Curtis, Walter L. Sievers, Bertie L. Noah, Robert D. R. Weigel, Carl Frick, Anton Nepper.

VINELAND, N. J.

By City Beautiful Committee: Joast N. Denelsbeck, Adolph A. Phillips, Frederick Van Deusen, Joseph Trucano, Clarence Hartman, Grover C. Hankins, Paul G. Kimball, Daniel Ogborn, Stanley Simpkins, Joseph Di Curcio, Grady R. Roberts, Albert E. Wilkinson, Arthur E. Brooke, Charles Phillips, Joseph Lenzi, Ferre Calkins, J. Alfred Ackley, Jr., Daniel B. Rhubart, Jack F. Gaskill, Aldo Bruge, Robert L. Van Deusen, Louis Gassel.

WALPOLE, N. H.

By Walpole Town Improvement Society: Henry Ellis Howland.

NEW YORK CITY.

By Mrs. Charles de Rahm, Jr.: Lieut. Charles de Rahm, Jr. By J. S. Kaplan: Lieut. Solomon Rubel.

WOODMERE, L. I., NEW YORK

By Marjorie D. Barlow: C. Loomis Dana, Jr.

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By Mrs. Robert S. Collyer: John Chipman Thomas.

GEISTOWN, PA.

By Geistown School: Joseph Nightingale, Othmar B. Grosch, Russell Berkey, Albert Brandle, John Brandle, Alfred Miller, Lloyd Hershberger, Charles Dill, George Nees, Thomas Nees, Victor Raab, Walter Christ, Samuel Zimmerman.

PITTSBURGH, PA.

By Fawcus Machine Company: Albert E. Pepper.

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By Dr. A. Zetlitz: Thor Zetlitz, Theodore Roosevelt.

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operation with the Forest Service in their national program was agreed upon as of vital importance just at this time, when a forestry policy was being formulated.

The Ayer and Lord Wood Preserving plant at Carbondale, Illinois, is one of the largest in the country and operates eight treating cylinders for treating railroad ties, zinc chloride being used at present. The plant employs as high as 285 men and treats about 15,000 ties per day. The plant for making and treating wood blocks has been temporarily shut down owing to the high price of longleaf pine. It is stated that only about 1% of the ties treated come from Illinois. Almost any species can be treated at present prices, beech being one of the new arrivals within the last few years. The Illinois Central has a treating plant at Marion, Illinois.

MASSACHUSETTS

ONE of the five state forests that have been established during the past four years in Massachusetts is situated in Southern Berkshire County, and is known as the Arthur Wharton Swann State Forest. It was a gift to the Commonwealth by Mrs. Susan R. S. Swann in memory of her husband. On this forest are many acres of chestnut growth in a dead or dying condition, and at its last session the legislature appropriated ten thousand dollars for the use of the State Forester in cutting and marketing this growth before it becomes completely valueless. It is probable that a mill will be placed on the reservation so that such sawing as may be necessary can be done without too great a haul.

After nearly a year's service in France as Y. M. C. A. secretary, Mr. Frank L. Haynes, Engineer for the State Forest Commission, has returned to this country and resumed his duties with the Massachusetts state forest department. While in France, Mr. Haynes was stationed at Aix-les-Bains, Chamonix, Paris, and St. Quay, which places were used as leave areas for the soldiers of the A. E. F.

Emulating the example of the Federal Government, Massachusetts is throwing open its state forests for the use of Massachusetts citizens for recreational purposes. The shores of the lakes and ponds within the borders of these forest reservations have been surveyed into lots of one hundred feet front on the water and two hundred feet deep. The camp sites have been divided into two classes—temporary and permanent. For the use of a temporary site a fee of one dollar per week is charged, and for the use of a permanent site the permittee pays a rental of ten dollars per year. Many of those who have selected camp sites contemplate the erection of substantial cottages. The lakes on these reservations have been stocked with bass and other varieties of fish by the Massachusetts Fish and Game Commission, so that campers are

assured of good fishing during the open season.

The auto-truck sprayers designed by the Massachusetts forestry department and used in connection with the suppression of the gypsy moth have proved to be very important factors in protecting the roadside trees from the depredations of these pests. They have taken the place of the horse-drawn sprayer, and by their use a much greater amount of territory is covered than formerly, with a reduced cost.

NEW HAMPSHIRE

TRAMPERS in the White Mountain National Forest will find ready for them next summer the first north-and-south trail extending through the area of land held by the Federal Government. The new trail will be made a reality by the construction of a link from Bartlett, New Hampshire, over Cave Mountain and Mount Parker to connect with the Davis Path on Mount Resolution. The link, which is to be constructed by the Forest Service of the United States Department of Agriculture, and the paths with which it will connect, will extend for approximately forty miles, from Wonalancet, at the extreme southerly end of the White Mountain group, to Appalachia, at the north of the Presidential Range.

Trampers can profitably spend a week in traversing the new route, according to Forest Service officials. It will pass over most of the Presidential Range, and will disclose some of the most beautiful scenery of this vacation land. Following is a description of the new route:

Old Mast road between Wonalancet and Passaconaway; Douglas Brook trail from Passaconaway to Bartlett; new link over Cave Mountain and Mount Parker to Davis path on Mount Resolution; Davis path to Crawford Bridle path, Gulfside trail, Valley Way to Appalachia.

The route is well supplied with shelter between Appalachia and Bartlett, while the hotel accommodations will be found at Passaconaway.

What to name the new route is being debated by the Forest Service men. One suggestion is that it be called Agiocochook, which is the Indian name for Mount Washington. This name is open to objection, officials say, because of its length and difficulty. There may be a compromise. In the meantime the office of the Forest Supervisor at Gorham, New Hampshire, invites suggestions.

The Forest Service also expects to have in operation early next summer the two public camping grounds that are being installed on Government-owned land. One is at the Dolly Copp farm on the State highway about five miles south of Gorham. The other is on the Profile road about seven miles from Twin Mountain, and about the same distance from the Old Man of the Mountains. The camp grounds are located in sheltered valleys and are well

supplied with piped spring water and sanitary conveniences. Each is to have a big stone fireplace for public use. Trampers, campers, and automobile parties will have free use of the grounds and conveniences, and they are invited to make use of them, subject only to the usual etiquette and protective restrictions that govern in the forests. It will be necessary, of course, for all visitors to supply their own tents.

Two acres of white pine, near Keene, New Hampshire, sold three or four years ago, before the war prices, brought \$2,000 on the stump. The total stand was 254 cords, which equals 170,000 board feet, or an average of 85,000 feet per acre. Much of it was 80 to 85 years old, so the growth was about 1,000 feet per acre per annum. Stump examinations showed a rapid growth the first 35 years.

MICHIGAN

TO date, nearly 8,000 acres have been planted with young trees on the logged over lands included within the Michigan State Forests. Some of the plantations are more than fifteen years old, but more than fifty per cent have been planted within the last five years. White pine has been planted more than any one other species, but Norway pine, Jack pine and Scotch pine are also planted largely. Austrian pine and European larch have been planted in an experimental way, but due to their inability to resist frost and drought have not succeeded well, and they are no longer used. The western species, lodgepole pine and western yellow pine were planted some years ago and gave promise of being splendidly adapted to some localities of this region, but unfortunately they were seriously injured by a fungus (*Peridermium sp.*) and all those which were planted were destroyed and no more have been set. Some few acres have been set to Norway spruce, but so far, due to their slow growth on the sand lands, they have not proven very encouraging to further planting.

Hardwoods have also been planted, poplars, oaks, walnut, black locust, etc., but none have succeeded in a satisfactory manner.

It is interesting thus to note that after fifteen years of experimentation, the conclusion is reached by the Public Domain Commissioner that it is those trees which are native to the region that are proving the most successful for reforestation. It is true that the exotic, Scotch pine, which is planted extensively in the European forests, appears to be perfectly hardy here, more so indeed than either white or Norway pine, but yet very good evidence indicates that it will not produce better lumber, if as good, as does the native jack pine.

All the trees planted are raised in the nursery located within the Higgins Lake Forest. The nursery has capacity to produce sufficient seedlings to plant, with stock averaging two years old, 8,000 acres

per year. The loss of seedlings in the nursery from all causes, including the white grub, grass-hoppers, damping-off, heaving, frost, and drought is less than one per cent yearly.

In the plantations, however, such excellent results are not obtained. Examinations of the plantations indicate that of the white pine two and three year old seedlings planted, about sixty per cent survive. Jack pine does better, although it is planted on the poorer soils and is but one year old when set, for it is found that fully sixty-five per cent of the tiny trees survive. Scotch pine is nearly as hardy as the jack pine, but Norway pine, apparently due principally to frost killing, shows but barely fifty per cent survivals.

These mortality figures are not discouraging to the Public Domain Commission. Each year it learns more about the types of soil and the requirement of the seedlings, higher percentages of survivals are obtained. Indeed, of the two million seedlings which were planted this spring, despite the severe droughts and frosts of this summer, fully eighty-five per cent have survived, and it is expected that seventy-five per cent of these will be firmly established in 1925. Since the commission plants from 1,500 to 2,000 trees per acre, despite the losses, good stands will be obtained.

NEW JERSEY

DURING the past summer State Forester Alfred Gaskill, of the New Jersey Department of Conservation and Development, published a leaflet, which was widely announced through the press, making known the desirability and many advantages of the State forests and parks for outdoor recreation, and extending an invitation to the public to use them in this way.

This policy has met with such success, as evidenced by the numerous inquiries and applications for camp sites, that the Department's proposal to create a forty thousand acre State Forest Park along the Kittatinny Mountain in Sussex county seems assured of public approval.

New Jersey is most centrally situated with respect to population, over ten million people living within a radius of sixty miles of the capitol at Trenton.

An enormous increase in applications for camp sites must be expected as the State's invitation receives wider consideration among so many people, who seek recreation within a convenient distance from their homes.

The forest extending along the Kittatinny Mountain is a most desirable one for the expansion of State holdings, as it is well suited for recreation purposes as well as the practice of forestry. The seven thousand acres already embodied in the Stokes State Forest afford an unexcelled vacation ground for lovers of outdoor life.



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Attractive camp sites, beautiful scenery, pure mountain air and spring water, trout fishing in season, are some of the attractions offered free to the public.

Nearby are the well-known mountain lake resorts—Culvers' Lake, Lake Owassa and Swartswood Lake, where fishing, boating and bathing may be had. This region is easily accessible by motor over good roads, and by railroad so that it may be reached in a little over three hours from Jersey City or Newark.

The Department is planning to enlarge this property to include forty thousand acres and create a great State Forest Park extending for thirty-five miles along the mountain from Delaware Water Gap to the New York State line.

This area will afford exceptional opportunities for the practice and demonstration of forestry management and protection, and at the same time will doubtless prove to be one of the most popular “public playgrounds” in the east.

NEW YORK

LUMBER and forestry interests in New York State are looking forward with interest to the second week of November.

Tuesday, November 11, has been definitely set as the date for the holding of the forestry conference at which Colonel Henry S. Graves, chief forester of the United States Forest Service, will discuss at Syracuse with all interested organizations his proposed national forest policy. This is the date of the meeting of the New York Forestry Association, and many manufacturers, retailers and dealers in lumber, foresters, and others interested in conservation have accepted invitations to attend and to hear Colonel Graves explain his proposed program.

Colonel Graves had originally agreed to hold a conference with the Empire State Forest Products Association, but the forestry association got the consent of the manufacturers to the present plan so that a more general discussion might be possible.

The Empire State Forest Products Association will hold its annual convention at Albany, November 13; the American Pulp and Paper Manufacturers' Association will hold a convention in New York City the latter part of that week. Thus many of those interested will travel from Syracuse to New York City by way of Albany to participate in the three conferences.

William Shemin, a graduate of the New York State Ranger School, at Wanakena, formerly working under a College of Forestry graduate, R. E. Waldenberger, city forester of Bayonne, New Jersey, followed his chief into the service and was wounded at Vesle, when in Company G, 47th regular infantry. He has now returned to his old chief, who has taken him to Niagara where Waldenberger is superintendent of the state reservation at Niagara Falls, New York.

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"The Dessert Berry of the Nation"

The Erskine Park Everbearing Red Raspberry



The Erskine Park Everbearing Red Raspberry is a seedling from the old reliable Cuthbert, discovered on the Westinghouse Estate (Erskine Park) at Lee, Mass., by Mr. Edward Norman. This magnificent estate is in the midst of the beautiful Berkshire Hills, with a temperature in winter of 30 or 40 degrees below zero, so that the hardiness of this berry is unquestioned. The estate is surrounded by the summer homes of many wealthy people, and much to the surprise of his neighbor gardeners and not without a deal of personal satisfaction, Mr. Norman furnished large, luscious raspberries throughout the fall for various dinner parties.

These berries are commented on by all who have seen and tasted them as the most delicious and best raspberry they have ever eaten. Mr. Baker of Hoosick Falls, N. Y., writes us as follows, regarding this remarkable berry:

"In the season of 1916, Mr. George M. Darrow of the United States Department of Agriculture was traveling from the Atlantic to the Pacific, visiting fruit growers to obtain information on berries for bulletins published by the Department of Agriculture. Mr. Darrow had visited this estate before, and was most favorably impressed that this berry was far ahead of the St. Regis and Renere, and when it became known it would replace these varieties. The plant is by far the strongest growing raspberry I have ever seen. It branches like a tree, and it also has the largest and most roots of any variety with which I am acquainted. It is perfectly hardy and the berries are very large."

Of this berry we cannot say too much in praise, and we predict

that once known, it will be a standard for planting in every garden and considered a necessity.

The Renere and St. Regis have been the standard up to the present time. In the Erskine Park we have a berry that far surpasses either of these; a raspberry that is a delight to eat, each berry being of largest size, with its delicious melting flesh, full of rich creamy juice, highly flavored and sweet as honey.

Conceive the joy and satisfaction of having such berries on your table all through the autumn, the source of wonder to your neighbors, that you can pick the finest raspberries until the snow flies. On November the 20th we cut a large branch of the Erskine Park with blossoms, green berries and ripe fruit upon it.

We have not as yet been able to propagate any large quantity of this magnificent berry, but what we have are the finest Bearing Two-Year Old Plants, heavily rooted and branched that will bring a full measure of pleasure and satisfaction to the planter.

Strong Field Grown Bearing Plants, per six, \$3; per twelve, \$5; per fifty, \$15
One dozen plants set this fall will produce more fruit than two dozen plants set next spring. Plant this fall.

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NORTH CAROLINA

THE North Carolina Forestry Association has adopted the following fourteen points in forestry and asks the support of the people of the state in securing and enforcing them:

1. The scientific classification of forest and cut-over lands as those chiefly suitable for grazing and forestry.
2. Increased ownership of non-agricultural forest lands by federal, state and municipal governments.
3. Regulation of cutting on non-agricultural land in order to maintain a productive and profitable crop, and for the protection of our streams.
4. Growing a crop of timber on agricultural land not yet needed for a more profitable crop.
5. Prevention of all unnecessary waste in cutting and marketing timber.
6. Protection from fire of all young growth as well as merchantable timber.
7. State investigations looking to the rehabilitation of our naval stores industry.
8. Practical control of serious insect pests and fungus diseases of forest and shade trees.
9. Protection of young and growing forests from livestock through proper control.
10. Effective public control of water powers as a natural resource belonging to all the people.
11. Development and management of Mitchell state park for the benefit of the people of North Carolina.
12. Maintaining and increasing the beauty of our highways by proper utilization of trees and shrubs.

13. Effective protection of birds and game both for their economic and aesthetic values.

14. Training of the young to know and appreciate the value of trees, forests and wild life.

OREGON

IN view of the recent destructive fires in the northwest forests, the Pacific Logging Congress has sent to all loggers in this vast territory a set of fire rules which are comprehensive and public-spirited. Among other rules they advise shutting down the mills during dangerous weather rather than risk a disastrous fire, not leaving a fire even after it is under control until it is thoroughly extinguished, giving fire fighting precedence over everything, using all vigor and resources, and maintaining closest cooperation with fire wardens and other government officials. Many rules cover technical matters and the subject has evidently been given very careful attention.

TEXAS

ALFRED MacDONALD of Newton, Massachusetts, has recently been appointed City Forester in Dallas, Texas. Mr. MacDonald was formerly Field Secretary of the Massachusetts Forestry Association and later spent two years in the Graduate School of Forestry in Harvard University studying problems concerning city forestry.

The city of Dallas is planning an aggressive Memorial Tree planting campaign for this fall and present indications are that several hundred such trees will be set out by the Forestry Department. The Boy



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Scouts have already been enlisted to assist in the work of the Forestry Department in locating dead trees and suppressing noxious insects.

Most of the trees heretofore planted in Dallas have been native species and For-ester MacDonald is planning to try, exper-imentally, trees of European and Asiatic origin, such as Norway Maple, Oriental Plane and Gingko, which have proved so successful in Eastern cities.

VERMONT

H. E. GRUPE, who went overseas with the 10th Engineers, was detached and put on special duty in Paris in criminal investigation, work entirely distinct from military investigation. He graduated from New York State College of Forestry in 1917, and has been engaged by the State Forestry Department of Vermont, being placed in charge of a district of the state forest.

WISCONSIN

A TEN-LESSON correspondence course in the kiln drying of lumber is offered for five dollars by the Extension Division of the University of Wisconsin in co-operation with the Forest Products Laboratory. The lessons are written in simple language and explain how lumber may be kiln dried for particular purposes with results which are superior to those produced by air seasoning.

A million-pound testing machine is being built for the Forest Products Laboratory



at Madison for use in an investigation of the strength properties of large structural timbers.

Sixty-five members of the Technical Association of the Pulp and Paper Industry visited the Forest Products Laboratory on September 26 and spent the day inspecting the various departments. The visitors were particularly interested in the facilities of the laboratory for studying the control of mold in pulp wood.

SPECIAL OFFER TO MEMBERS ONLY

One of the following described books will be presented free of charge to any member of the American Forestry Association who secures ONE NEW subscribing member:

- No. 1—Field Book of American Trees and Shrubs, 465 pages, 275 illustrations of trees, leaves, blossoms, fruits, seeds, area of growth, etc.
- No. 2—Field Book of Wild Birds and Their Music, 262 pages, 38 colored and 15 other full-page illustrations.
- No. 3—Field Book of American Wild Flowers, 587 pages, 24 colored plates and 215 full-page illustrations.

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FOREST FIRE PERIL ENDS

REPORTS and estimates from representatives of the Forest Service, United States Department of Agriculture, indicate that the period of the greatest forest fire peril that has ever confronted the Forest Service has been brought to an end by heavy rains and snows in Montana and northern Idaho. Until this sorely needed assistance from nature arrived the wooded areas of the district were so dry that fires gained terrific headway with astonishing rapidity.

A surprising number of electric storms occurred over these tinder-dry regions, unaccompanied by sufficient rain to check the flames which were started by lightning. More than half of the fires in the regions, reports show, were begun by such electrical discharges.

To meet this peril in Montana and northern Idaho, a maximum of 4,500 extra men were employed in addition to the regular forces in the field. By reason of what was probably better organization than has ever been effected heretofore, the fire fighters were able to keep the flames very largely away from the more valuable timber. While no definite figures are yet available, it is estimated that the burned area totals approximately one million acres. Much of this, however, was land which had been burned over at some previous time. What is known as a blow-up—a wind of great velocity—occurred during the season, and added greatly to the labor of the fire fighters. For a time it was feared that the destruction wrought might be as great as that in 1910.

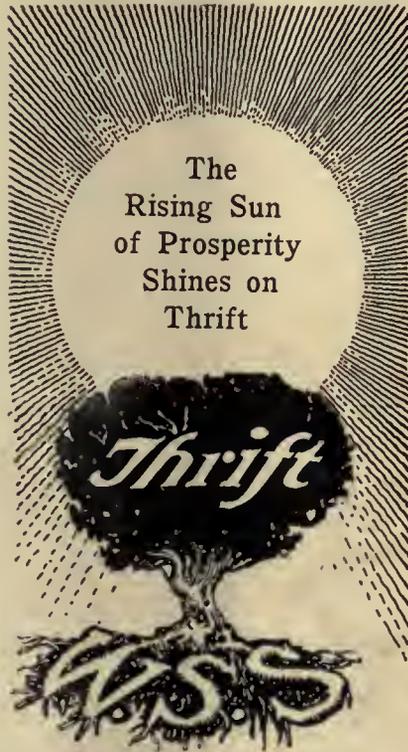
This season seven men lost their lives fighting the flames. Two died of spotted fever, one from over-exertion, and four were killed by falling trees. In 1910 more than 70 men were killed and many towns were wiped out. One crew of men this year was seriously imperiled and for many hours it was feared they had been cut off by the advancing flames. Another crew was forced to remain in a cold stream for 18 hours to avoid being burned to death, and similar measures were taken to save a pack train.

CARRIER PIGEONS REPLACE TELEPHONE

IN Oregon, as elsewhere, the telephone operators have been striking for better working conditions and as a result service has been more or less disturbed. William Sproat, of the Deschutes National Forest, however, did not worry much when he went to East Lake on special work, for instead of depending upon "central" at Bend to give him the proper connection, he took with him some carrier pigeons and in this way it was easy to send messages to his wife. The carriers made the distance from the forest to the cote in about 20 minutes and there was no "listening in" either.

PASSING OF LUMBER INDUSTRY IN PENNSYLVANIA

N. P. WHEELER, manager of Dusenberg and Wheeler Lumber Company, of Endeavor, Pennsylvania, says his company has between 6 and 7 years more to operate and its operations are closed in Pennsylvania. There are only four large operating concerns now in Pennsylvania: Good Year Lumber Company, Norwich, which, it is reported, has one year's cut left—about 50 million feet; Salmon Creek Lumber Company (E. S. Collins), Kellett-



ville, has a life of perhaps 3 or 4 years; the Central Pennsylvania Lumber Company, Williamsport, operates five mills and will finish in all probability in 6 or 7 years. The cut of these four companies will approximate 225 million feet. (*Timberman*, November, 1918, page 55.)

DOUGLAS FIR INVADES SOUTHERN PINE TERRITORY

DIMENSION lumber is going right into Southern pine territory—a recent visitor in Portland, from Kansas City, a buyer for a wholesaler with line yards is authority for the statement that: "All of the retail yards west of the Mississippi River are handling nothing in Southern pine excepting finish and flat-grained flooring, everything in the shape of dimension is fir."—A shipment of oil rig stock or big timbers into Texas is regular but it seems strange to ship fir flooring into Dallas, but that is being done by a Washington mill whose headquarters are here, while Denver, that used to be a divided market between fir and Southern pine, is now absolutely fir. (*West Coast Lumberman*, May 15, 1919, page 25.)

NORTHERN PINE CUT IS LESS

THE steady decrease in the cut of lumber in Minnesota will be more in evidence in 1920 than is generally supposed," says R. F. Pray, manager of the Red River Lumber Company, of Westwood, California. "The J. Neils Lumber Company, of Cass Lake, with a cut of 40 million feet, and the Nicols-Chisholm plant of the Shevlin interests at Frazee, with a similar cut, finish this year. In addition, the Weyerhaeuser plant at Little Falls, cutting 75 million feet, will saw its last board this season, and the two mills of the Northern Pine Company, at Minneapolis, with a combined cut of 100 million feet, will finish operations, to which must be added a 50 per cent reduction in the Cloquet group of mills, making a total reduction in 1920 production of approximately 450 million feet. Last year the Leach Lake Lumber Company, at Walker, Minnesota, closed. It had an annual capacity of about 20 million feet. The Deep River Lumber Company, at Deep River, Minnesota, closed in 1918, with a cut of 40 million, making a total reduction of at least 500 million feet in northern pine districts." (*The Timberman*, June, 1919.)

THE DECLINE OF A ONCE GREAT WHITE PINE CENTER

A RATHER gloomy picture of lumber conditions in the Tonawandas (Buffalo) is painted by a correspondent who says that but three lumber-handling gangs of twenty men each are working. A quarter century ago thirteen gangs of thirty men each were working almost constantly during the navigation season. Not enough lumber is coming in this summer to keep three gangs busy. He adds:

"The Tonawandas once held the record for being the largest lumber port in the world, but Chicago took that title from the local cities ten years ago and has since held it. The lumber industry here is being replaced rapidly by a variety of industries though it still holds an important place in the business world." (*Hardwood Record*, June 10, 1919.)

Think in interest—your own interest—save and invest. War-Savings Stamps pay 4 per cent interest, compounded quarterly.

LEAVES AND THEIR USES

Boston Herald

There is a great opportunity for some inventor to turn "the flying gold of the ruined woodlands" into real money by adding one more ingenuity to our new-found methods of economizing fuel. This is the season which we name from the fall of the leaves with little thought that foliage, moist on the tree or dry on the earth, has any sort of connection with daily living. Thickly as it may "strow the brooks of Vallombrosa," we treat it as an outdoor spectacle to be revelled in and nothing more and as we draw on the resources of our leaf bins, not to supersede coal, but to take comfort in a fair and cheap substitute for wood, it will be ours to wonder "why it was never thought of before."

GRASS

By John J. Ingalls

Late Senator of Kansas

"GRASS is the forgiveness of Nature—her constant benediction. Fields trampled with battle, saturated with blood, torn with the ruts of cannon, grow green again with grass, and carnage is forgotten. Streets abandoned by traffic become grass-grown like rural lanes, and are obliterated; forests decay, harvests perish, flowers vanish, but grass is immortal. Beleagued by the sullen hosts of winter, it withdraws into the impregnable fortress of its subterranean vitality and emerges upon the solicitation of Spring. Sown by the winds, by wandering birds, propagated by the subtle horticulture of the elements, which are its ministers and servants, it softens the rude outline of the world. Its tenacious fibers hold the earth in its place, and prevent its soluble components from washing into the sea. It invades the solitude of deserts, climbs the inaccessible slopes and forbidding pinnacles of mountains, modifies climates and determines the history, character and destiny of nations. Unobtrusive and patient, it has immortal vigor and aggression. Banished from the thoroughfare or the field, it bides its time to return, and when vigilance is relaxed, or the dynasty has perished, it silently resumes its throne, from which it has been expelled but which it never abdicates. It bears no blazonry of bloom to charm the senses with fragrance or splendor, but its homely hue is more enchanting than the lily or the rose. It yields no fruit in earth or air, and yet should its harvest fail for a single year famine would depopulate the world."

The South's future depends upon full utilization of its vast idle acreage, in agricultural pursuits, live stock raising and reforestation.

Cut Over Land Department

**Southern Pine
Association**

New Orleans, La.

Southern Pine Association

NEW ORLEANS, LA.



1941

AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

NOVEMBER 1919 Vol. 25

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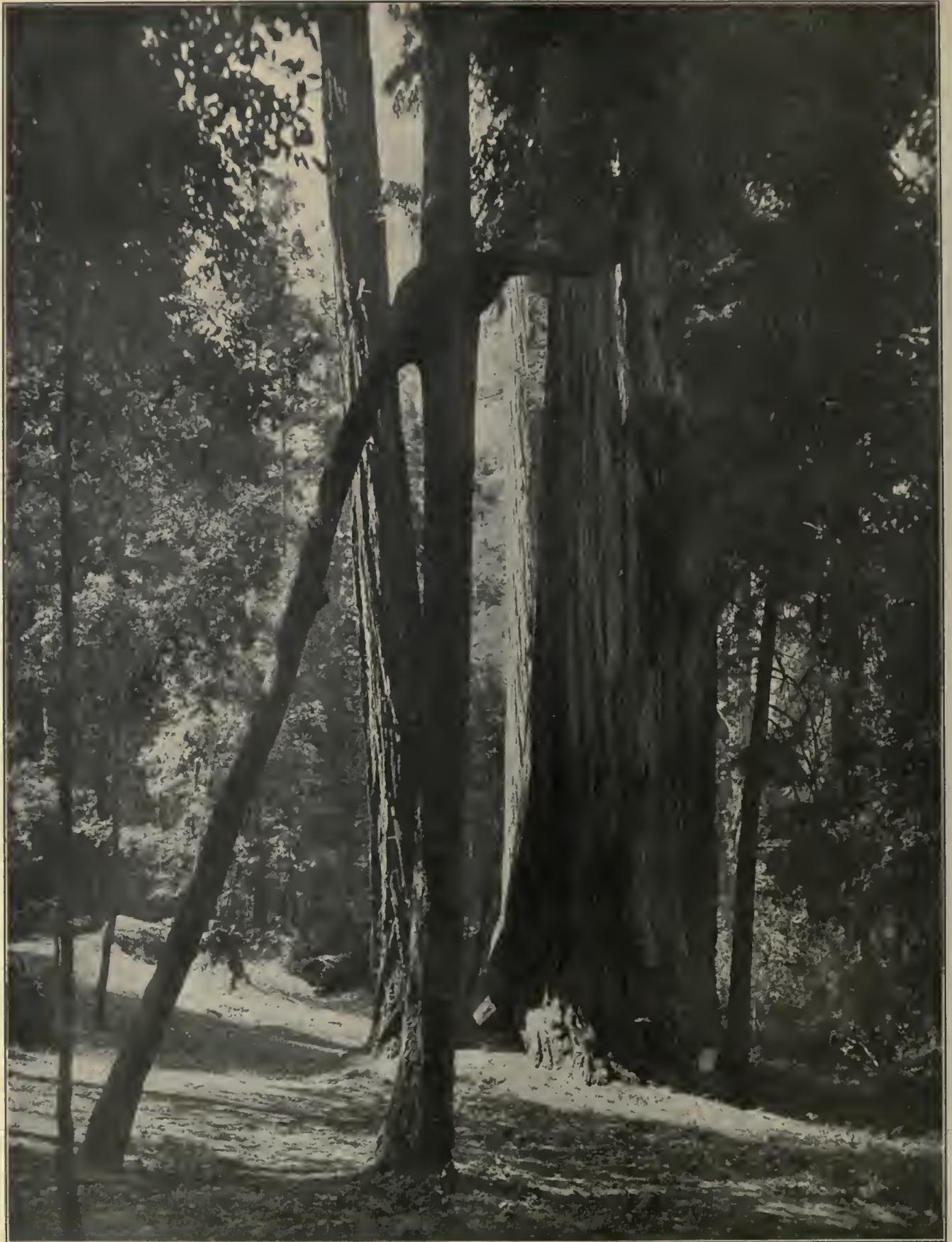
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IN BEAUTIFUL PARADISE VALLEY, MOUNT
RAINER NATIONAL PARK

Entered as second-class matter December 24, 1909, at the Postoffice at Washington, under the act of March 3, 1879. Copyright, 1919, by the American Forestry Association. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized July 11, 1918.



THE GLORY OF THE REDWOODS

Stupendous trees, venerable for their age, world wonders for their size, staggering to the imagination in their lumber content, beautiful as marble statuary in their symmetry. "And the great trees watch and wonder much. Surely a new race is coming on down there; men who measure their girth in love, not in greed. Through their branches the almost unbelievable message runs—'These men worship God with us!'"

AMERICAN FORESTRY

VOL. XXV

NOVEMBER, 1919

NO. 311

THE GLORY OF THE REDWOODS THREATENED BY FIRE

BY M. B. PRATT, DEPUTY STATE FORESTER OF CALIFORNIA

FOREST, range and grain fires have burned over larger areas and have caused more loss in California this summer than in many years. The fire hazard was especially high as early as July due to the small amount of precipitation in the spring months, high hot winds and an unprecedented host of vacationists in the mountains, a number figured by some observers as being twice the normal. With these conditions prevalent, it is remarkable that the fires were kept down as well as they were by government, state, county and private agencies. It was not until the latter part of September, when the first fall rains were expected, that a period of intense heat accompanied by strong north winds caused the small fires to become conflagrations in a short time. In spite of every effort, fires raged uncontrolled in different parts of the state for about two weeks and it was not until a general rain fell on September 27 that they were finally controlled.

The fires in southern California were the largest since the great fire of 1910 in the San Bernardino Mountains. Fanned by heavy winds, small fires in various sections of the Angeles National Forest escaped beyond control to form a continuous line of flame over thirty miles in length and ten miles in depth. A raging, roaring sea of flame raced through Pacoima Canyon, often called the most beautiful camping spot in southern California, destroying eight summer homes and the attractiveness of the place for many years to come. The \$100,000 ranch property of Cecil B. De Mille in Tejuanga Canyon was left a mass of black-

ened ruins. San Gabriel Canyon was also fire-swept and a number of cottages destroyed. At the same time fires in the San Bernardino Mountains were burning within two miles of the Los Angeles city playground, and threatening Squirrel Inn and Thousand Pines in the Rim of the World resort region.

On September 24, the Mayor of Los Angeles issued the following proclamation:

"There is raging in the Angeles National Forest Reserve, near this city, fires which threaten the entire area. We all appreciate the value of this forest. It is, from the standpoint of irrigation and flood control, priceless. It is our duty as citizens of Los Angeles to do everything in our power, to use all of the resources at our command, to co-operate with the local forest office to extinguish these fires. I feel that this fire may prove more serious to the present as well as the future generations than would a large fire in the heart of our city.

"Therefore, I request that every person who can in any way, independently or through organizations, collectively, get in touch with the local forest office and aid them in their efforts to extinguish these fires."

(Signed)

MEREDITH P. SNYDER,
Mayor.

Forest Supervisor Charlton soon had twenty-five hundred men on the fire line, and the assistance of District Forester DuBois and other district office men from San Francisco. Airplanes and free balloons from March and Ross fields took observations on the fires, and the work became so well organized that much progress was being made

in checking their spread at the time of the rain.

A preliminary estimate of the area burned over places it at 237 square miles, or 151,680 acres. The Forest Service probably spent \$50,000 for labor and supplies, and lost timber and watershed cover valued at as much more. The loss of property, including that of permittees



STILL STALWART AND STRONG

Although the base of this redwood is eaten out by fire and rot until it is hollow, the tree is so sturdy that it might and undoubtedly would, stand for generations to come, if untouched by fire.

is high, but the most serious consequence of these fires will be the damage which will result from the rapid run-off during the coming rainy season.

At the same time that southern California was experiencing the worst fires in its history, terrific fires were raging in the northern part of the state. On September 19, the most destructive fire that was ever experienced in Marin County, swept the slopes of Mount Tamalpais to the edge of Muir Woods before it was checked. In a few hours, more than twenty residences and summer cottages near Mill Valley were destroyed. A thousand fire-fighters which included detachments of soldiers from Fort McDowell and Fort Baker were needed to bring this fire under control.

While the Mill Valley fire was at its height, the fire in Hurricane Gulch that had previously threatened Sausalito, broke out again and swept down upon the water-front with irresistible force. The residents, exhausted from their long fight with the fire the night before, appealed to Mayor Rolph, of San Francisco, for aid. He dispatched a fire boat with thirty firemen at once, but by the time the boat had reached Sausalito the fire had burned a hall, five stores and a dozen residences. Five hundred soldiers and sailors were brought in from nearby posts and the fire was finally controlled. It is estimated that the property loss in the two Marin County towns from these fires exceeds \$200,000.

On September 20, a fire which was the result of slash burning on a lumber company's holdings in San Mateo County, swept into Santa Cruz County and entered the California Redwood Park. It was fought for a week by several hundred men, at one time coming within half a mile of Governor's Camp in the Big Basin, having claimed one hundred of the world's greatest trees. The big redwoods do not burn readily, but become weakened by brush fires about their bases and finally topple over with a great crash, carrying smaller trees with them.

"Great trees were falling all night," said Park Warden Dool. "When they fall they can be heard a mile and a half."

This is the first fire in Redwood Park in modern history. Many of the redwoods had been hollowed by previous fires—400 or 500 years ago—and so fell more readily before the flames.

"The redwoods that have fallen run to six feet in diameter and are from 250 to 275 feet high," said the Park Warden. "They were from 1,500 to 2,000 years old." An irreparable loss.

Rain came to the relief of the fire-fighters, but not until about five thousand acres had been burned over, including 1,600 acres in the proposed addition to the park. In San Mateo County, one hundred soldiers were brought from San Francisco to protect valuable private redwood and tan-bark oak holdings. The damage to the mature redwoods was not great beyond the falling of some trees through the further weakening of their fire-scarred butts. The greatest damage was through the burning of the intermingled Douglas fir and tan-bark oak, the value of which is estimated to be twenty-five dollars per acre.

The foothills of the Sierras were aflame during the latter part of September, a dozen or more fires being sighted in one day by the aerial patrolman from Mather Field on his daily round trip to Oroville. Placerville was surrounded by fires which deluged the town with falling ashes and cinders. Yuba, Nevada, and Placer County ranchers lost thousands of acres of dry feed and young timber, besides many buildings and



A WELL-KNOWN OLD BEAUTY—"JUMBO"

The great base of Jumbo—knotted and gnarled, the pride of the grove. These old trees made heroic resistance to the devastating fire which threatened their destruction in the early fall.

miles of fences. At this time, October 8, there is still a possibility of large fires unless rain falls shortly, since a heavy wind is rapidly drying out the moisture resulting from the previous rain. Fire reports show that the acreage burned over and the resulting damage has been greater than any year since 1910.

The lesson taught by these fires surely must have been learned by now. In commenting upon them an editorial

in the San Francisco *Examiner* of September 28, says in part as follows:

"We believe it would pay some prospective legislative candidate to make a serious study of the effects, in the past, of forest fires. He should get the facts of the actual money losses represented by these fires. He should become acquainted with the state's forest resources, the rates of use and the rates of renewal, and the enormous hole that is cut in these resources each year by fires.

"Mr. Homans, we feel sure, will be very glad to give him all the assistance he needs in acquiring such information.

"And then this prospective legislative candidate should make his election campaign on an issue of adequate forest protection and, when he is elected, should make a two-fisted fight exclusively on this issue. We believe he would win the attention of the entire state on such an issue. And if the state can once be aroused there is no question that the Department of Forestry of the State of California will get its rightful place somewhere near the center of the state's activities, instead of being considered, as it too frequently has been considered in the past, a sort of side issue."

Recent extension of the California State Highway system through Humboldt County, has made the magnificent redwood forests of the northern coast easily accessible to the lover of nature, to the tourist, and to important industries dependent upon forest products. This extended use of the highway coming at a time of unusual activity following the war, has brought us to sudden understanding of the value and interest of these forests as unique wonders of nature, and to realization of the imminence of their disappearance before the requirements of this great lumber-using country.

The Save the Redwoods League was organized to assist in bringing about a better and more general understanding of the value of the primeval redwood forests of America as natural objects of extraordinary interest as well as of economic importance, and for the purpose of bringing into unity of action all interests concerned with the movement to preserve such portions

of these forests as should be saved to represent their fullest beauty and grandeur.

The plans of the League involve: (1) The securing of a belt of the finest redwood timber bordering the northern highway, in the hope that this area may become a state park. (2) The obtaining of a considerable body of the most typical primitive redwood forest known, for the purposes of a National Redwood Park.

Determination of the precise limits of the particular areas to be selected for park purposes will be based upon a carefully prepared report furnished by the Committee on Redwoods Investigation, including the most competent authorities in America.

Mr. Mather has given himself wholeheartedly to support of the movement to preserve the redwoods, and in co-operation with a group of leading men representing all parts of the country, he is continuing to make clear to the public the national significance of these magnificent forests.

The movement to secure forest areas bordering the highway for purposes of a state park has received enthusiastic support from a wide range of organizations in California as well as from a great number of individuals concerned with the welfare of the state. It has been generally recognized that the redwood forests constitute a natural asset of this country to be ranked in importance with the great mountains and valleys as monumental works of nature. To have the northern highway traverse the groves along the streams means bringing the finest

of these trees to their fullest usefulness. There is reason to hope that the desires of those who have planned the preservation of these areas may yet be realized.



A VETERAN, HOLLOWED BY THE AGES

This is the type which fell most readily before the flames, having been hollowed out and weakened by previous fires four or five hundred years ago.

CALIFORNIA'S REDWOOD PARK

BY ARTHUR A. TAYLOR, SECRETARY CALIFORNIA REDWOOD PARK COMMISSION

WHEN Uncle Sam was figuratively still sitting by the stove whittling and talking about the weather, unaware of, or indifferent to, the scenic and esthetic importance of his domain, the state of California wakened to the hereditary value of its redwood forests and bought back at a price a fragment of the inheritance the Federal Government had sold for a song.

Late in the last century it was perceived that the redwoods were rapidly disappearing before the demands of commerce and the ravages of fire, and after an active agitation a law was passed authorizing the purchase of a tract of virgin forest in the Big Basin, Santa Cruz County, to be preserved and protected "for the honor of the state of California, and the benefit of succeeding generations."

The redwood tree, as is generally known, lives only in California and a small part of Oregon. There are two species, the Sequoia Washingtoniana of the Sierras, and the Sequoia Sempervirens (ever-virile) of the coast ranges. It is the largest tree and the oldest living thing on the earth. Many of the redwood trees of California were saplings when Hiram of Tyre was hewing the cedars of Lebanon for Solomon's Temple, and these trees are not aborigines, but descendants of a long line of ancestors, contemporaneous with the mammoth and the mastodon.

A sound redwood log was found in a mine in the state of Nevada 1,900 feet underneath the surface of the ground and some of the predecessors of the present day trees are preserved in the petrified forests of Arizona. A few of the juvenile redwoods of our era attain a height of 350 feet, and a girth of 60 feet. There are hundreds of redwoods in the

California Redwood Park of 250 feet in height, in diameter varying from 12 to 15 feet—and these were the trees threatened by the recent terrific fires. These trees are growing on the site of prior forests wherein the trees attained dimensions double the size of those now living. This fact is attested by the root rings left in crater-like

circles to outline the trunks of trees which, after an unthinkable longevity have died and decayed—been absorbed by the soil and dissipated by the winds. These mute mementos of the giants of other days are quite as impressive as the majesty of the living trees.

California selected the Big Basin in Santa Cruz County for its forest reserve, not only on account of the size, abundance and beauty of its redwood trees, but for geographical and topographical reasons.

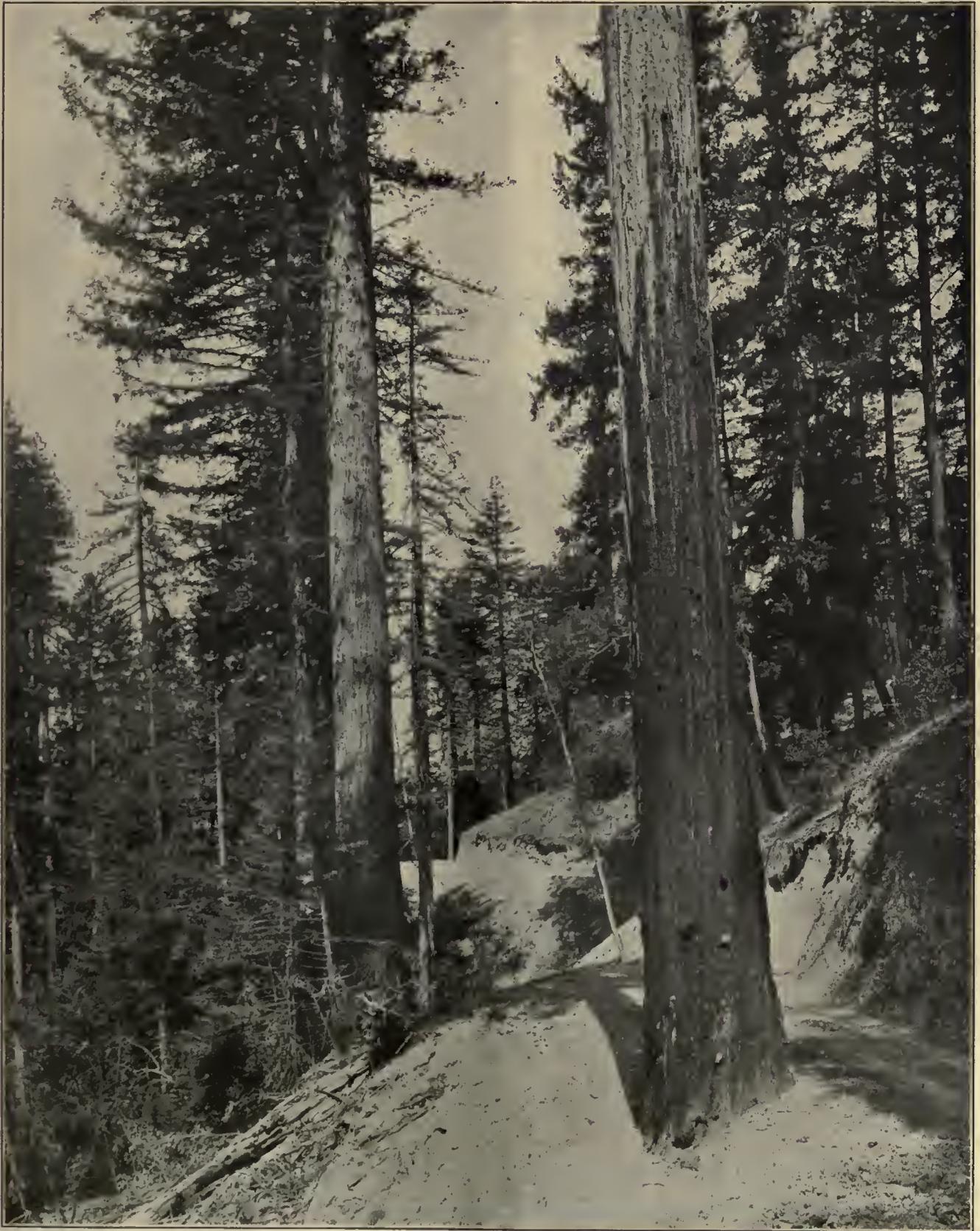
The park is easy of access from Santa Cruz, San Jose and Palo Alto, and within a three hours' auto ride from the cities about the bay of San Francisco. The Big Basin is an irregular fan-shaped area embracing about 14,000 acres surrounded by elevations of an average of two thousand feet above sea level. The dotted peaks about the margin range from 2,500 to 3,000 feet in height and the lowest gap of entrance is 1,600 feet. While these figures do not indicate high mountains, the altitudes are impressive because the ocean lies in view and the range of vision covers fifty miles or more landward, over a panorama of rapturous diversity and beauty.

The main floor of the Basin where the largest and most interesting redwoods abound is at an elevation of 1,000 feet. Here are located at what is known as the Governor's Camp, the office of the Warden, and the Redwood Inn, with accommodations for visitors and campers.



GUARDING THE NEW GENERATION

Note the young redwood, offspring of the giant parent tree, guarded on each side by sentinel trees.



ALONG THE BEAUTIFUL AND INSPIRING REDWOOD TRAIL

Long ages before this road was built, these giants stood—sentinels on the hillside—awaiting the coming of man, when he should know and claim them as his own. To protect and preserve them for coming generations is now man's solemn duty.

Hereabouts is a grove of stupendous redwoods, venerable for their age, world wonders for their size, staggering to the imagination in their lumber content, beautiful as statues in their symmetry—many of them—others, grotesque of form, rugged of exterior, living witnesses of their conflict with the centuries, through fire and tempest.

"And the great trees watch and wonder much. Surely a new race is coming on down there; men who measure their girth in love, not in greed, taking the place of creatures they used to dread more than rot and disease, or blasting, consuming fires. Through their branches the almost unbelievable message runs—'These men worship God with us.'"

Although California's forest reserve takes its name from the redwood, the peculiar and prevailing tree, yet its value as a park is augmented by the fact that within its limits are to be found nearly every variety of forest growth peculiar to the Pacific Coast.

The other trees include firs, pines, oaks of several species, the madrono, buckeye, California nutmeg, manzanita, while the shrubs and flowers of the park run well into the hundreds, and under the fallen foliage are fungi gardens of exquisite, half hidden beauty.

These trees and this forest entrance the beholder, and uplift with a conscious awe and sublimity, not aroused by man-made temples or cathedrals.

It took Titanic power and aeons of Time to make this place. Dr. J. C. Branner, President of Stanford University and one of the most famous geologists of his day, finds fourteen formations in this area and nine distinct and far-reaching geological disturbances recorded in the rocks, leaving the strata folded and crushed, impossible of clear definition, but affording a reason for the marvelous fecundity and variety of the vegetation. This Basin as finally left for man is a series of ravines and ridges. The creeks are numerous, fed by living springs which gush forth from mountain sides at altitudes of from one to two thousand feet. These springs are, some of them, clear as crystal, and many of them are impregnated with mineral

substances. The stream that flows past the Governor's Camp is called Opal Creek, on account of its color, due to mineral content. A chalybeate spring, to the west, is large enough and strong enough to transform the brook into a stream of liquid gold.

It makes a fall of about 60 feet in a shimmering shower of gold, of a beauty altogether beyond expression in words. It soon reaches another drop of about equal distance, the water changing in transit into copper color. Again it falls as bronze and after flowing a few hundred yards leaps over another precipice, a sheet of silver.

When streams fall a thousand feet in a mile of distance it is inevitable that there should be numerous picturesque cascades and these form no small part of the charm of this woodland.

The California Redwood Park is not only a sanctuary and a sanatorium for world-weary men and women, but it is a haven of refuge for birds and animals. No guns or dogs are allowed within its limits, and deer and squirrels show no sign of fear.

As Virginia Garland expresses it in writing, the trees in Sempervirens Park are looking down on a different manner of men, and they no longer dread the ax and the saw.

When acquired by the state the forest of the Big Basin was inaccessible except on foot or on horseback over a trail dating from the days of Indian occupation, and it required as much time to arrive from the town of Boulder Creek, twelve miles distant, as it does now to make the run from San Francisco in

an automobile. The park is now reached over a well graded road from Santa Cruz via Boulder Creek, or from the Santa Clara side over the new state highway via the town of Saratoga, opened in 1915. An auto stage runs from Boulder Creek and also from Saratoga during the season. Private automobile tourists usually enter by one route and return by the other.

It is no disparagement of the forest or of the wonders of the redwoods to state that the trip thither is perhaps as attractive and compensating as time spent in the com-



THE FAMOUS SANTA CLARA TREE

Awe-inspiring and impressive these giant trees stand—the oldest living things on earth—an ever-new source of reflection to men.

panionship of the great trees. Travelers who have toured France and Switzerland and have had wide experience in estimating scenic values, declare that the charm and beauty and picturesqueness of this trip is not excelled. The scenery of the Santa Cruz Mountains approaches grandeur but it is not overawing. It is kaleidoscopic, a new angle of vision revealed at every curve in the road, but all its lines are graceful, its aspect never void of beauty.

The summit above Saratoga is gained at an altitude of 2,700 feet at Fairview. Here a most entrancing panorama is spread. Facing eastward, at your feet lies the

Mountains descending oceanward. The panorama appeals instantly to the artist. Comprehensive in its fifty miles of compass, sublime in its heights and depths and distances, exquisite (we use the word advisedly) in the tinting of the landscape, bringing within the vision the astronomical, agricultural, commercial, educational and industrial glories and beauties of Central California.

From this point to the heart of the forest is not more than five miles as the crow flies, but it is fifteen as the park highway runs, on uniform grades from four to six per cent. The right of way is 200 feet in width and forms a pan handle to the park, being under its juris-



THE TWIN GIANTS—OHIO AND HAVERFORD IN THE MARIPOSA GROVE

These two are among the most notable trees in the grove. The view of the cabin through the opening in the base of the Haverford and the whole condition of this tremendous base is not only most impressive but most convincingly indicates the great age of the tree and its mates.

Santa Clara Valley, town dotted, orchard checked, varicolored with trees, pastures, grain fields and the habiliments of a fertile valley. Beyond rises Mount Hamilton, crowned by the Lick Observatory, and to the northwest Mount Diablo. Northerly a clear day will give glimpses of the intruding bay of San Francisco, or if this is fog shrouded, the imagination can complete the suggestiveness of the picture. Facing westward before you are the seamed, sloping, evergreen ridges of the Santa Cruz

diction. Northerly along the crest of the mountain the road flirts with the boundary line between Santa Cruz and Santa Clara counties, alternately disclosing expansive views seaward or valleyward, an exhilarating experience to the sightseer. It then bends down the mountain side descending until it reaches the gap which marks the divide between the waters flowing to the Pescadero and those reaching the bay of Monterey at Santa Cruz. Continuing its winding it ascends to an altitude of 1,900

feet when it passes over the rim of the Basin, to reach its destination 900 feet lower at the Governor's Camp.

The way is partially through tall timber, partially along the open rock ribbed mountain side with outlooks upon the canyon of the San Lorenzo River and its tributaries, upon mountain peaks and ridges, and at favored points peeps of the Pacific extending to the horizon, a sea of molten gold, under midday sun, or a dim grey haze when cloud-veiled or fog-covered.

A guide post directs to a near eminence from which one may look down into the slopes and depths of the untouched, untraversed redwood forest, covering thousands of acres, beneath the eye. An evergreen sea more impressive than the one made of water, which impinges against the westward horizon.

If it is early season, the water courses will be outlined by billows of blooming azalias, with here and there a flash like fire, coming from some Tiger lily which has

THE GIANT REDWOOD

By M. J. Riordan

When Babylon was riotous thy head

Was wise with years; when Bonaparte on cold

Helena's rock lay still thy heart was bold

As youth against the storm; no hair has fled

Of all thy leafy locks through age; the dead

Since thou wert young have swept in ranks untold

To immortality; straight as of old

Thou wait'st the generations still unbred.

Why build we monuments of crumbling stone

Or tawdry brass and bronze to mark a name

And spare mere memory to unheeding time?

It were far sweeter, though to be unknown,

To rest beneath green trees. Could marbled fame

Sleep softer bring though graved with sacred rhyme?

caught a sun ray. If you tarry in the park you can camp at your pleasure without cost, or abide in the inn at reasonable rates. Lodgings are in tents or cabins. At night a huge camp fire is a common meeting place, where song and story always abound.

Tomorrow you can take a hike over some trail through the recesses of the forest, following a stream, or climbing a ridge. The next day this experience may be duplicated in another direction, and there is distance and diversity enough to make a week seem short, especially if you are fond of locomotion by "shank's mare."

To the unaccustomed eye the trees look alike and the wildwood has a uniform aspect as a city seems like "all buildings" to the countryman, but when you get the Indian vision of the forest, you will discover that every tree has an individuality as distinct as that which distinguishes men and women. You will soon be striking friendships with these people of the woods, and find them companionable, the most soothing, restful, inspiring personalities you ever met. Every rill and ripple of flowing water, every cascade and rapid has a melody of its own,

but blending in a unison which is in tune with the Infinite.

The lumberman gazes with amazement upon the acre of standing timber, good for half a million feet of lumber. He computes the contents of a single tree which could be converted into ten cottages, and he is glad that these trees have been saved for him to see.

The true Nature lover finds every foot of this temple soil sacred. He walks with bared head, his vision is rapt, his voice is seldom heard. And the joy of it all is that this woodland, wonderland, is to be preserved, saved, perpetuated.

CHURCH BUILT FROM ONE TREE

BY H. E. ZIMMERMAN

IN Santa Rosa, California, is a Baptist church which will hold 400 people, built entirely from timber sawn from a single redwood tree. Everything used in the construction of this church was furnished by this one tree with the exception of the necessary glass and hardware. The spire is 100 feet high, and there is a pastor's study 12 x 20 feet, as well as a vestibule, toilet room and parlor



THE REDWOOD TREE CHURCH

seating 100 persons. This church is 60 feet wide by 100 feet long, and cost \$5,000. Only two-thirds of the tree was needed for the necessary lumber. After the roof was finished it was found that there were 60,000 shingles left over. A sister tree to this one furnished employment for two years to two men in reducing it to shingles.

A CHRISTMAS SUGGESTION

Are you puzzled about the selection of Christmas gifts?

Why not give a year's subscribing membership in the American Forestry Association as a gift. It will cost you \$3.00, and the member will receive American Forestry Magazine for a year.

This will be an ideal Christmas gift for a child or an adult.

Send the money to the Association and a Christmas Card will be sent you to present on Christmas Day.

THE FOREST CODE AND THE REGIME FORESTIER

BY W. B. GREELEY, LIEUT.-COL. OF ENGINEERS, U. S. A.

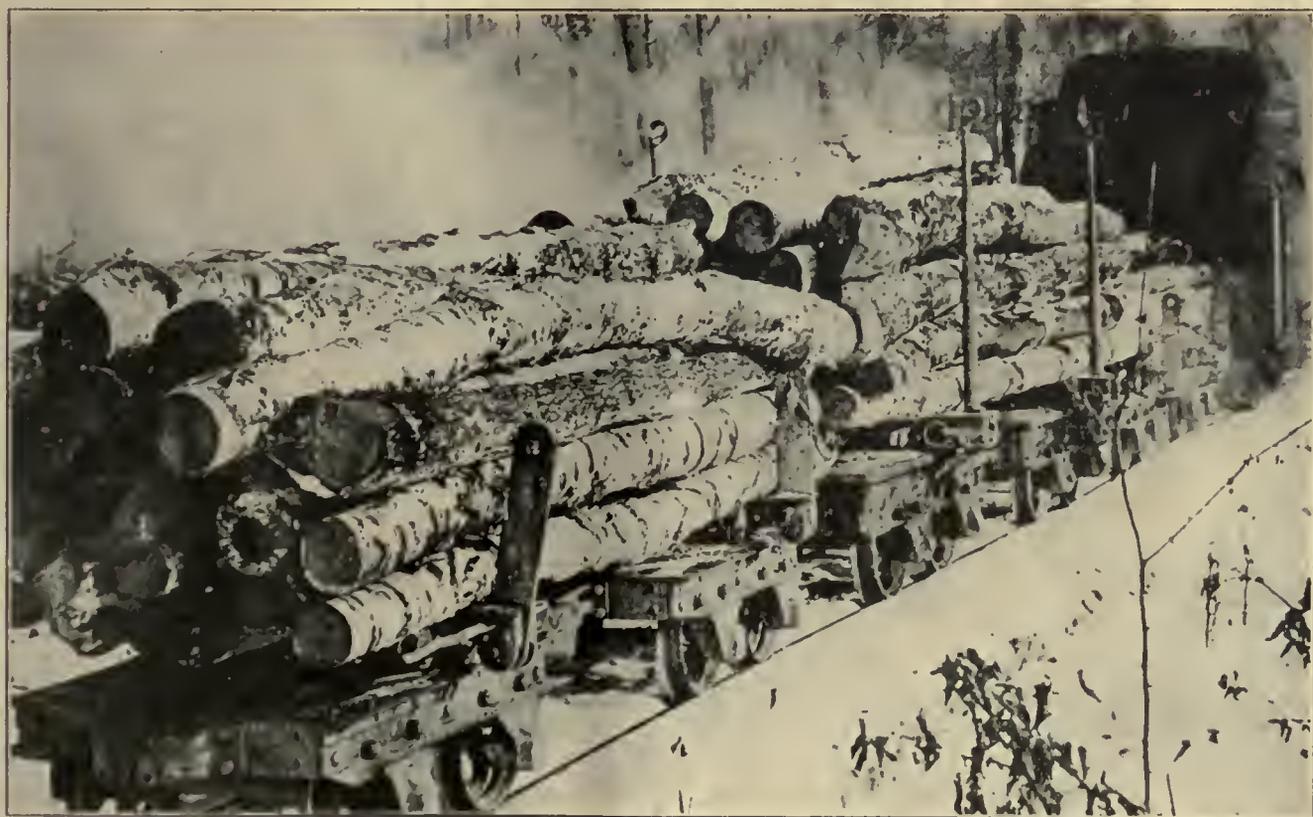
THE "regime forestier" means to the French the sum total of laws and administrative decrees applicable to forests under all forms of public ownership. It thus actually governs about one-third of the forested area of France; but the public administration of this third, affording opportunity to standardize and demonstrate cultural methods in every section of the country, is the core of French forestry.

The requirements and protection of the "regime" extend to all state forests, to all communal forests which are adapted to forest management, and to the forested properties of public institutions like hospitals, charitable organizations, and ecclesiastical foundations. They may be extended to communal lands whose reforestation is deemed desirable by the Government. They are applied automatically to all forests and planting areas within the limits of national projects which are undertaken for the stabilization of sand dunes or for the checking of erosion on mountain slopes. They may be extended to private forests at the voluntary choice of the owner, but otherwise have no direct application in the handling of timbered lands in private ownership.

The basis of the "regime forestier" is the forest code of France, which stands today in substantially the form in which it was adopted in 1827. This detailed and com-

prehensive code is deeply rooted in the forestry laws of the old imperial days, particularly in Colbert's Ordinance of Waters and Forests of 1669, which dealt minutely with waterways, fishing, and hunting as well as with forests. Many penal provisions of the forest code are taken bodily from Colbert's Ordinance and preserve—in the liberty-loving France of today—much of the harsh and arbitrary conceptions of penal law characteristic of the times of Louis XIV. In this as in other respects, the code is a striking expression of the French attitude toward their forests—as a resource which the common law alone is inadequate to conserve and protect. Because of the ease with which the productivity of forests may be impaired, because of the long time required to restore it, once reduced, and because of the far-reaching public and economic interests at stake, forests stand apart from other forms of land and require a special code exceptional in its restrictions and in the severity of its punishments. French discussions of the code refer constantly to the necessity for restraining the "juissance" (enjoyment or use) of forests by their owners in order that their national utility may not be destroyed. Nothing else in French jurisprudence is comparable to this body of special laws created for the conservation of their forests.

The "regime forestier" is applied today to about



A FRENCH LOGGING RAILROAD

These railways of 60 centimeter gauge (24 inches) are quickly built, the rails and ties being light. Somewhat similar roads were built for carrying ammunition and supplies to the troops and where there were woods they were easy to hide from enemy observation.

7,870,000 acres of forest in France, not quite one-third of her total forested area. 3,000,000 acres of this amount are the property of the French nation and their management sets the standards of public administration. The history of these state forests reflects the ups and downs of the fortunes of the French kings, of her political upheavals, and of her changing economic theories. Large forests in northern and eastern France were undoubtedly properties of the Roman emperors and were held later by the Frankish kings by personal right of conquest. The later kings, as the first feudal lords of the realm, held numerous forest domains usually burdened with old rights of usage acquired by the local rural communities. Forest ownership, in fact, became an attribute of royalty and nobility and was sought by the dominating classes of the feudal and imperial regimes as a bulwark of their prestige in the state. It still carries the stamp of social prestige in the French provinces—an inheritance from the days when the possession of large hunting preserves was a coveted distinction of the grand seigneur. In the course of the centuries the royal forests went through numerous vicissitudes from conquest, marital transactions, cessions to rebellious or lukewarm nobles, and grants to royal favorites. Certain of them became in time the property of the state, others remaining in the personal possession of the reigning family.

One of the first steps toward the conservation of public forests, which is of special interest in view of the seeming indifference of

the times toward the future, was the Edict of Moulins in 1566, which declared that all forests owned either by the state or by the king in his own right were inalienable and—by inference—protected from prescription or seizure under any color of claim whatsoever. Although this decree was often abused by the kings themselves, through various fictitious engagements or contracts which amounted to the alienation of public forests, it undoubtedly had a conserving influence up to the time of the French Revolution.

With the outbreak of the Revolution, the royal forests were declared to be the property of the state. A law of 1789, placing all church property at the disposition of the nation, resulted in adding considerable areas of forest

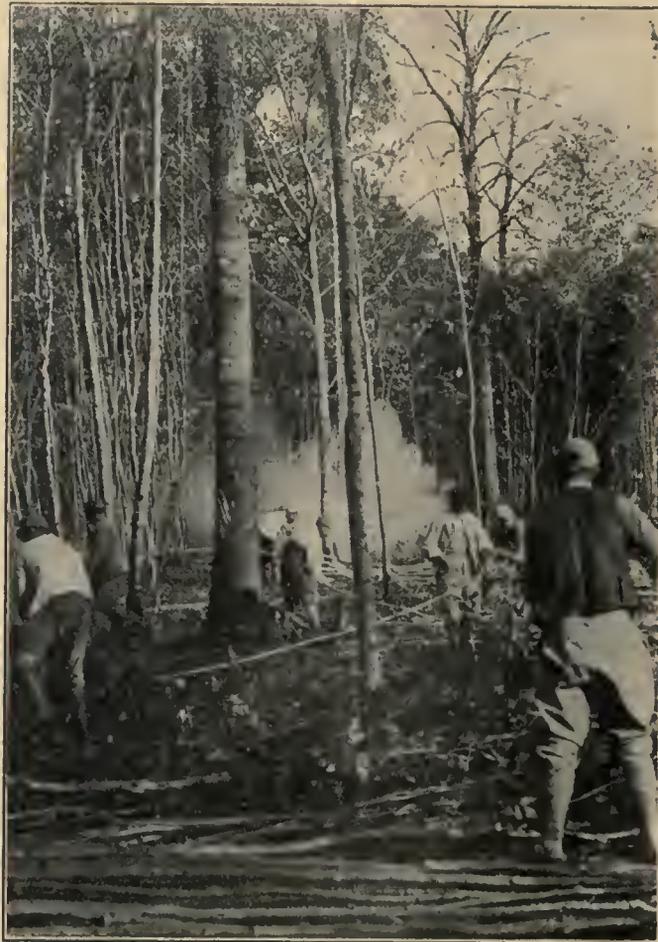
to the public domain. Three years later the forests owned by emigres of the old nobility were confiscated by the state—but most of these were subsequently restored to their former owners. The first effect of the Revolution was toward the nationalization of forest resources, but counter currents soon set in. In the reaction from the abuses and usurpations of the seigneurs of the old regime, the rural communes were encouraged to take possession of forests under almost any pretext based upon entailed rights or old claims. The confiscated properties of the king did not escape, and the state lost heavily from the inroads of the communes into its newly

acquired forests. The Edict of Moulins was also formally repealed and large areas of state forest were sold outright under the individualistic economic theory of the times. The recorded sales of hardwood forests in central and northern France, for example, probably the most valuable part of the public domain, aggregate 880,000 acres. It is significant that every French Revolution was followed by fresh disposals of state forests. From the Revolution of 1789 to the establishment of the Third Republic, the attitude of the French toward their public domain was strikingly similar to that in the United States during the period of active disposal of its public lands.

Under the Third Republic, the policy of France has turned definitely and aggressively in the opposite direction. Alienations of national forests have been restricted practically to small areas granted to vari-

ous communes as a means of liquidating long-established entailed rights, or privileges to take timber and fuelwood for domestic use. On the other hand, the state forests have been enlarged by plantations in the sand dunes and by the purchase and reforestation of mountain areas in connection with projects for the control of erosion.

A most interesting phase of public forestry in France and one of special suggestiveness to America is the communal forest. The French commune is comparable to the New England township—a self-governing, rural community of exact geographical limits. The feudal system developed a peculiar solidarity of interests among the members of these little communities. The system of



AT WORK IN OAK COPTICE

Many of these French workers still in uniform are engaged in chopping wood for fuel to aid in overcoming the coal famine in France this winter.

entailed rights in the royal and seigneurial forests developed largely from the sheer necessity of meeting the needs of the local agricultural population for wood—for fuel, farm buildings, and implements. Entailed rights were usually held and exercised by the villages of serfs or tenants in common. They became community rights,

The communal forests in France today aggregate more than the holdings of the state itself. And under the terms of the forest code, the great bulk of them are administered by the national service in accordance with the requirements of the "regime forestier." In other words, they form part and parcel of the public forests and meet the same needs in national economy as the timberlands owned by the central government.* The communal forests still serve their original purpose of furnishing supplies of wood for local use, particularly fuel. But under the careful supervision of the national forest service, they also produce quantities of large timber which are utilized for the general requirements of France. They furnished a fifth of the timber cut by the American Army. Some communes own and operate their own small sawmills. These forests are an important source of revenue for hundreds of French villages, reducing taxes and affording the means for constructing town halls, roads, and other local improvements. The situation in France would be paralleled if every village in New England or the Lake States owned 500 or 1,000 acres of forest, kept con-



ROAD THROUGH A FRENCH STATE FOREST

A great deal of care and attention is given in France to the building and maintenance of roads, one of the features of France with which the American visitor is impressed.

so firmly established as to be a fixed and accepted factor in the forest legislation of France from its earliest development.

In the breaking-up of the feudal system and the overturning of the old order under the Revolution, these little communities asserted their old rights and claims so vigorously as to acquire many small tracts of forest and pasture land in fee simple. The history of the communal forests is a complicated one. Their acreage has been swelled from various sources, including community purchases in some instances. Following the Revolution, the acquisition of forests by the communes was largely antagonistic to the slowly developing policy of national conservation. But during the past half century, French policy has aimed steadily to harmonize and correlate the two forms of public ownership. Following the success in controlling sand dunes on the southwestern coast, the planting of many communal holdings in the sand plains of the Landes was required by special legislation, with state supervision and aid. 185,000 acres of communal forests were created outright by this co-operative enterprise. A somewhat similar policy has been followed in the French Alps as part of the effort to protect mountain slopes from erosion.

tinuously in the best state of production, furnishing the timber locally needed, affording a substantial revenue for community purposes, and providing means for the steady employment of a number of its workers.

The forest code establishes the principle that all public



A CAMOUFLAGED ROAD

The French were particularly skillful in hiding their roads from the enemy flyers so that their transports to the front could continue without attention from the enemy artillery.

forests must be placed under a definite scheme of management, the main point of which is to fix the amount of wood which may be cut yearly without reducing the growing stock, or capital, and to prescribe the method of cutting so as to maintain the productivity of the prop-

* There are practically no forests in France owned by the Departments, the political divisions corresponding to states in America.

erty. It is significant of the importance attached to the handling of public forests by the French that each forest plan must not only be approved by the high council of the Service des Eaux et Forêts and by the Secretary of Agriculture, but must also be authorized by decree of the President of the Republic. Board rules of management are laid down by ordinances supplementing the code itself. In administering the communal forests, the highest monetary return is the main consideration. The function of state forests, however, is declared to be the supplying of national industries with the classes of products which they most need, particularly large timber which may not be grown on communal and private forests because it may not pay the highest returns. The purpose of state forests is thus to supplement, as may be necessary, the materials produced in the largest quantities by communal or private owners with choice timber whose growing is long and costly. As a matter of fact, these distinctions have largely disappeared under the free working of economic laws in fixing the price for various classes of timber.

The working plan for the state forest of Gerardmer, one of the areas cut by the American engineers, illustrates the extremely interesting but simple technical methods of the French service. This is a forest of fir, spruce, and beech in the high Vosges. A revision of the old plan had been made necessary by serious windfalls and failure to cut the old timber at a sufficient rate (a characteristic result of French conservatism). The new plan begins with a resume of revenues during the past twelve years,* including the lease of quarries and of hunting and fishing privileges, the sale of tree seed and seedlings, and rents from mountain meadows for pasturage. Then follows an exact estimate of the stumpage, in two classes—large timber and immature or middle-aged timber. The normal growing stock (to be maintained without diminution) is fixed at 350 cubic meters per hectare, or about 29 thousand board feet per acre. This figure is not based upon calculations for the forest but upon general experience in forests of this type in the Vosges. In the same way, the yearly growth of the large timber is estimated at 5 per cent and of the smaller timber at 2 per cent. By these simple methods, the annual "possibilité," or permitted cut, is placed at about 785 board feet per acre, a figure which is to be exceeded for a time in order to remove a surplus of old growth.

The bulk of the plan is devoted to an exact description of the various divisions of the forest, as marked out on the ground, with the order in which they are to be cut during the ensuing thirty years. The entire forest is to be worked over in that interval under the selection method, which consists essentially in removing the larger trees to a number not exceeding the prescribed limit each year. The working plan terminates with a detailed allotment of funds for maintenance and improvements during the same period. These include the construction and repair of roads, the upkeep of five state sawmills, planting designated blank areas, cutting out brush which is

covering young trees in places, and maintaining a small fish hatchery.

The French state service manufactures its own stumpage to but a very limited extent. The lumber or logs, in such cases, are sold at auction. The great bulk of public timber is sold on the stump, following advertisement by printed circulars specifying the exact areas where cutting will be permitted and the estimated quantities to be removed. The sales are made by lump sum for the marked timber on a stated "coupe" at public auctions, in which the crier begins by naming a price far in excess of the value of the timber and then reduces it successively until he finds a taker. The forest officers seldom scale the logs after cutting, as is done in the National Forests of the United States. This is a weak point in their system, both because of the speculative element in sales based upon estimate only and because of the failure to obtain a definite and authoritative check upon their estimates.

As would be expected, the cutting is subject to extremely rigid rules enforced by heavy penalties. These are standardized in published regulations and are so thoroughly ingrained in the lumbering practice of the country that little difficulty is experienced in their enforcement. One of their interesting features is the requirement that operators furnish stated amounts for repairing the roads used in logging, for the maintenance of their splendid system of forest transportation is one of the most jealously guarded features of administration. The whole system of cutting in small lots scattered over a forest in accordance with the requirements of its working plan depends upon the highway system. As much as three per cent of the purchase price may be exacted for the upkeep of roads.

The French administrative ordinances contain detailed stipulations for secondary uses of public forests such as the extraction of resin, the barking of cork oak, the pasturing of grasslands, the operation of quarries, and the removal of peat or of sand and earth for industrial purposes. Such uses are permitted under a leasing system operated by the forest service. The rights to sub-surface minerals, however, are entirely distinct from the ownership of the land; and their development is controlled by a separate group of laws. These are applicable to all forms of land ownership in the country and are of interest to Americans in contrast with the mining laws of the United States and the innumerable complexities which they have interjected into our public land system. No land owner in France has, per se, any title or claim to subterranean mineral deposits; and conversely the holder of mining concessions has, in virtue of that fact, no right to the surface of the land beyond the areas actually used in his operations.

The ownership of underground mineral resources is vested in the French nation. The owner of the land may prospect for minerals as he pleases and may concede prospecting rights to others for any consideration which he chooses. Prospecting privileges can be obtained by outsiders on any land in France, regardless of its ownership, by administrative decree. Such decrees are issued

* These averaged about 73.5 francs per hectare yearly, or \$5.75 per acre.

upon the recommendation of the public Engineer of Mines and after the owner of the land has been given a hearing. They are usually limited to a period of two years and provide indemnities to the owner for injuries to the surface of the property. Mining concessions, following a mineral discovery, are awarded by decree of the State Council. The procedure for obtaining them is a complicated one. Hearings must be given to the owner of the land and to adverse claimants of the discovery; a detailed investigation of the merits of the discovery must be made by the National Department of Mines; and many restrictions as to the proximity of mining operations to buildings, enclosures, etc., must be observed. The owner of the land has no preferential rights to mining concessions; his claim, if one is made, must be based upon priority of discovery. The terms of each decree fix the

It has often been used as an argument against the alienation of public forests and in support of legislation for retaining public control of forest areas in one form or another. Although the wooden frigate has disappeared from the seas, the special provisions of law designed for its protection still hold. Representatives of the navy may put their special mark on any trees included in sales of public timber, which are needed for naval construction. The purchaser of the "coupe" must then cut and limb these trees without reimbursement. The navy takes possession of them in place and buys them from the Forest Administration under a scale of prices which is fixed from time to time by a special commission.

The most complicated and, in certain respects, the most significant features of the forest code of France are its penal provisions. As I have pointed out before, zeal for



GATHERING FUELWOOD IN A FRENCH FOREST

Whereas in the United States the removal of slashings after cutting of timber is an item of cost to the lumberman, in France people pay for the privilege of going into forests after a cutting in order to gather fagots. Gathering and sale of fuelwood is a regular industry.

duration of the mining concessions and the indemnities to be paid to the owner of the surface. These, in principle, are equivalent to double the normal income from the portion of the land which the mining concessionaire will occupy.

The old solicitude for an adequate supply of large timber for the French navy has an interesting survival in modern French legislation, although the practical necessity for it has largely disappeared. It recalls the days when the broad arrow of the English king was stamped upon the finest trees in the forests of New England. Dating from the forest legislation drafted by Colbert in 1669, the assurance of an abundant supply of large timber for the navy has figured largely in French forest policy.

forest conservation in France has resulted in carrying over into her modern penal code many of the harsh and arbitrary provisions of the "ancien regime." A fixed schedule of fines and imprisonments is applicable to violations of the forest code upon the sole verification of the fact that an offense has been committed. Considerations of good faith or mitigating circumstances are excluded. This rigorous protection of the public forests is taken almost bodily from Colbert's ordinance drafted in the middle of the seventeenth century and has resisted every attempt at sweeping revision because of the deep-seated conviction in France that forests stand apart from other matters of public concern and require extra legal measures for their preservation.

The maze of detailed prohibitions and penalties in the penal sections of the Forest Code is bewildering to the foreign student. Yet they throw much light upon French conceptions of forest conservation. For example, the code provides not only for penalties to the state (fine or imprisonment) and civil damages to the owner of the land for tangible loss or injury to his property but also for damages to intangible interests such as the disruption of a plan of management. The innocent trespasser who cuts green trees pays a fine, the commercial value of the stumpage cut, and a further sum representing the value of the trees to the owner for further growth and seed production. The fine for cutting trees over 20 centimeters in circumference is 50 centimes for each tenth of a meter of circumference for each tree, in the case of most hardwoods, and 25 centimes for other species. A lower fine is imposed if trees less than 20 centimeters in circumference or if limb or branch wood are cut. For every tree cut which has been planted or sown by hand, the fine is three francs, together with obligatory imprisonment for one month. The distinction between planted and naturally grown timber, however, ceases after the trees become over five years of age. If the wood is removed from the forest, added penalties are imposed of ten francs for each wagon-load, five francs for a pack-load upon an animal, and two francs for a man-load of fagots or poles. The difficulty in estimating intangible damages has led to the adoption of the rule that such damages shall be adjudged as not less than the penal fine. They may be as much more as the owner can establish to the satisfaction of the court.

While the admission of mitigating circumstances is forbidden, the courts are compelled to impose severer penalties in cases where an offense is repeated within twelve months, when it is committed at night, and when illegal cutting is done by the saw. In the last two instances, the purpose of the more severe punishment is to discourage trespasses under circumstances which render them difficult of detection. The difficulty of the forest service in preventing unauthorized grazing and the stress placed upon injuries to forest reproduction by grazing have led to exceptionally severe penalties for offenses of this class, involving obligatory imprisonment in most cases. This extends even to swine herders who have purchased grazing rights to acorn masts but whose pigs stray beyond the designated areas. The unauthorized introduction of animals into areas under the "regime forestier," whether they graze or not, is subject to an arbitrary schedule of fines. These range from 25 centimes to one franc for each pig, sheep, or calf and from 40 centimes to two francs for each ox, goat, or beast of burden. And it is especially noteworthy that the fines are doubled if the animals are discovered in woods under ten years of age.

The obvious principle of the forest code is to take no chances. Any person found in a public forest off of the ordinary roads with wood-cutting tools in his possession is liable to a fine of 10 francs and confiscation of his outfit. Counterfeiting the official marking hammer of the state service is punishable by forced imprisonment for

twenty years. A series of protective zones is established around the exterior boundaries of all public forests. Within 500 meters, no workshops, yards, or factories which fabricate or trade in wood can be established without special authority. Within a zone of 1,000 meters, furnaces or fuel-using factories are similarly excluded; while sawmills are forbidden within a zone of 2,000 meters except under permit from the forest service. The intent of these drastic restrictions is to prevent the existence of commercial establishments in locations where timber cut illegally might be quickly or readily consumed, disposed of, or changed in form so as to render detection of the trespass difficult. The penalties for unauthorized establishments within the prohibited zones are fines ranging up to 500 francs, enforced demolition of the structures, and, in extreme cases, confiscation of the timber found in them from whatever source. When sawmills are authorized within the 2,000-meter zone, they must notify the forest guard of each lot of logs which they are to receive and hold it for his inspection and marking before it can be manufactured.

It requires but very slight acquaintance with the personnel of the French forest service to appreciate that this penal system is far more onerous on the statute books than in actual enforcement. While the laws and penalties savor of the seventeenth century, their present-day application is eminently human and modern. This could not be otherwise in view of the tact and diplomatic skill of the French forest officers, practically all of whom, rangers and guards included, receive special training for their functions; and particularly in view of the personal individualism and latitude with which the French official usually handles his local situation. Particularly during the last fifty years, the Service des Eaux et Forêts has sought to overcome the antagonism of local populations to the state forests and forest policy; and the terrifying list of penalties represents today a latent measure of last resort rather than an active instrument in current administration.

This practice is, indeed, strongly supported by provisions of the Forest Code itself. One of the characteristic expressions of French temperament and administrative instinct in the code is the wide authority given to administrative officers to compromise its violations. Before judgment is rendered, such compromises can dispose of the entire matter, even when the offender is liable to imprisonment. Following a judgment, pecuniary penalties only can be compromised. The Forest Conservateurs, who are usually in charge of a Department, can compromise cases where the fines and damages do not exceed 1,000 francs. Even the most serious violations of the code can be settled out of court by the Secretary of Agriculture. In actual practice, by far the larger proportion of trespasses and other offenses are disposed of in this direct fashion.

American foresters find special interest in the provisions of the Forest Code dealing with fire. To light a fire within 200 meters of any forest under the "regime" is prohibited, except on the part of the owner or of per-

sons authorized by him, or in the case of fires necessary in the exercise of public franchises. A fine of from 6 to 10 francs is imposed for refusing or neglecting to render aid in fighting forest fires when called upon to do so. The French point of view toward forest conservation is well illustrated by the provision that while the incendiary firing of cut forest products is penalized by imprisonment at forced labor for limited periods, an incendiary fire in a forest is punishable by imprisonment at forced labor for life.

A special fire code has been developed by recent legislation for the forests of Maures and Esterel, bordering the Mediterranean coast, whose dry conditions and consequent fire hazard are comparable to our southwest. All owners in this region are prohibited from the use of light burning to destroy underbrush, a practice formerly common in connection with the harvesting of cork oak bark. All fires within 200 meters of any area of forest or brush land are forbidden, on the part of the owner or anyone else, from June first to September thirtieth. The Prefet (Departmental governor) alone may, upon the recommendation of the Forest Conservator, permit charcoal burning or fires for other industrial purposes within the restricted areas during this hazardous period. Any owner of forest or brush land in this district can compel an adjoining neighbor to clear and maintain jointly, at the limits of contiguous holdings, a fire trench which must be kept clean of herbs, brush, and resinous trees. In default of a friendly agreement, the width of such trenches, within limits of 20 to 50 meters, is fixed by the prefet. This law has been widely employed by the state to protect the borders of public forests. Similarly, railways traversing forest or brush lands in this region can be required to clear and maintain fire breaks 20 meters wide on each side of their right of way. The railroad must make its own settlement with adjoining land owners who are affected. One of the most interesting and constructive features of the fire code for southwestern France is the offer of state aid to communes in the construction of roads designed to complete the system of fire defense. The assistance offered is 3,000 francs per

kilometer of road, probably half of the average cost of construction. The real value of the "regime forestier" to France does not consist in its elaborate and painstaking legal code. It can be gauged only in appreciation of the administrative skill of the French, of their practical genius for co-operation, and of the high intelligence of many elements in the rural population of the country which has resulted in extending the technical practice in public forests far beyond their own limited area. The public forests form but a third of the forested land in France. But they and their staff of trained officers are present in every section. Their administrative methods set the standards, and their results demonstrate good forestry practice to every timber owner in France. How to cut and



CHARCOAL PRODUCTION

This is an important forest industry in France and is a means of utilizing a great deal of small material. In the French forests because of this close utilization, very little is wasted.

reproduce timberlands has thus become common knowledge. It is the rule to find the local Conservateur des Eaux et Forêts the recognized authority of his Department on forestry matters, the leader in discussions of its local problems, the adviser of forest owners of all classes who come to him for counsel. This process has led indeed to forms of direct co-operation, in the special recognition given to associations of forest owners and in the opportunity to place private holdings under the technical methods and legal protection of the "regime" at cost. The "regime forestier" is thus the core of French forestry.

This fact points out a clear road to the United States. In the beginnings of our forestry development, public forests under technical administration should have a dominant part. They should be present in every section. They should be identified with its local problems of fire hazard, of timber growth, and of provision for future needs. They should develop the silvicultural practices adapted to our varied types of forest and make them common knowledge by concrete demonstration, the most effective of all educational measures. We will do well to adopt on a large scale the admirable French institution of communal forests. We need State Forests in every state and we need a large expansion of our National Forests, to include every forest region in the Union. In democratic America as in democratic France, a corps of public forests will be the key to effective progress.

A TRIBUTE TO DR. J. T. ROTHROCK

FORESTERS all know and honor Dr. Rothrock for his life-long devotion to forestry and to public service.

The State of Pennsylvania owes to him the original establishment of a free sanatorium at Mont Alto for the open-air treatment of tuberculosis. This project, dating from 1902, has grown under the encouragement of the State into a large and efficient hospital, and is being managed and supported by the State, through the Department of Health.

Dr. Rothrock's fellow-members in the Chester County Medical Association, with the co-operation and support of the State Department of Health, arranged for the placing of a bronze tablet on a large boulder in front of the ward for children at the sanatorium, and appropriate exercises were held at the sanatorium on Thursday, October 9, 1919.

There were present at this meeting a number of Dr. Rothrock's friends and admirers and addresses appreciative of his great record of altruistic and self-denying devotion to public service were made by Colonel (Dr.) Edward Martin, Commissioner of Health of Pennsylvania; Dr. Henry S. Drinker, President of the Pennsylvania Forestry Association; Dr. Lewis H. Taylor, of Wilkes-Barre, and Dr. Joseph Scattergood, Chairman of the delegation from Chester County, who presided at the ceremonies.

The inscription on the tablet reads as follows:

Joseph Trimble Rothrock, M. D.,
Botanist, Soldier, Explorer, Pioneer in the cause of Forest
conservation in this Country
established the first free Sanatorium
for the open-air treatment
of Tuberculosis in Pennsylvania
at Mont Alto in 1902.

This tablet was placed here
as a token of Honor and
affection by his fellow-members
of the Chester County Medical
Society in 1919.

In responding Dr. Rothrock spoke as follows:

Few, if any, public institutions, which have achieved success, owe their origin to those in whose hands they came before the world. This great sanatorium is no exception to the rule.

In 1877 a legacy left by F. Andre Michaux to the American Philosophical Society, for the promotion of Forestry in America, became available. There was in Philadelphia, still active and vigorous, a venerable, distinguished member of the Philadelphia bar, a life-long, public-spirited citizen, the Hon. Eli K. Price, who had for years witnessed with anxiety the ruthless waste of our forests. He had recognized the fact, as few others had done, that we were destroying the proper proportion of forest to cleared land, and dooming a large portion of the state to a barren condition. He, at once, called that legacy into use, and had instituted a course of lectures in Horticultural Park in Philadelphia, which became popular under the name of the Michaux Forestry Lectures. It is well to note that at that time the word "forestry" hardly appeared in our American dictionaries. Those lectures became one of the most active forces in leading up to the Pennsylvania Forestry Association, which was the direct cause of the creation of the State Forest Reservation Commission in 1893, which Commission has developed, or led, to the development of our splendid State Forest Reserves. The original impulse was due to the Hon. Eli K. Price.

Your speaker was, in 1901, the head of the Forestry Commission. The fresh air treatment of tuberculosis was then partly possessing the public mind. It was nothing new to me. I had imbibed it from my youth up, for my father, an honored country doctor, had, a half century earlier, made the discovery that those of his tubercular patients who lived most in the open-air, lived

longest. I had noted, in 1873-74, the effect of open air upon two tubercular patients under my care in an exploring expedition operating in the mountains of Colorado. The thought flashed upon me that I had under my control, as Commissioner of Forestry, 600,000 acres of State land, which by right of purchase belonged to the citizens of this State! Why, therefore, should any of them be deprived of a chance for life because he could not go to Colorado? In my travels I had learned the common report that on this mountain no case of tuberculosis had ever developed, though on the other side of the valley it was rife. Was it true? If so, what was the cause?

Without warrant of law I determined to make a trial here of a camping ground, to which the sufferers might come, board themselves, and drink our pure water and inhale, without cost, the fresh air that belonged to them. Such, in 1903, was the origin of this camp. There is still here, in the capacity of matron, one of the two first owners, a lady whose husband, Mr. Andrew Klee, was restored to fair health, only to die several years later by a heart trouble. The success and the popularity of the camp led to the question—how was it to be maintained? We had not a penny of aid from the State. There was none in sight from any source!

"In 1903 there was a meeting of the State Federation of Pennsylvania Women in Carlisle, at the close of which a large number of delegates visited the camp." As a result of this visit, Mrs. Scarlett, then vice-president of the Eastern District, was enabled to contribute from that District sufficient funds to prevent the closing of the camp, which, at one time (from lack of fuel) seemed inevitable. I wish here to add my grateful acknowledgment of that timely assistance, and to say that one of the representatives of the Federation, Miss Mira L. Dock, is with us today. Her constant, effective assistance, her interest in the camp, has never ceased. Without it we would have fared hard.

So far as I am aware, no sufferer was ever allowed to leave camp for want of aid to keep him here. In 1907, on the request of the Forestry Department, the care of the infant sanatorium was transferred to the Department of Health. A new, larger career for it became possible. The then Commissioner of Health, the late Dr. Samuel Dixon, recognized at once the peculiar advantages of the situation and the vast importance of the work begun and possible here. I am not sure that any extensive plans relative to sanatoria similar to this, under state direction, had been earlier considered by him—but I do know that he promptly resolved to push the work on a larger scale. The country was then in the flush of the open-air treatment.

The policy of Dr. Dixon was abreast of our knowledge at the time. He and his able coadjutor, Dr. Johnson, built up a great institution here, the fame of which rendered the creation of the sanatoria at Cresson and Hamburg not only easy, but necessary.

This institution has safely passed through its period of probation and with new life, with a saner policy which has grown out of past experience, it starts upon its career under its new, distinguished chief, Colonel Martin, whose record yields abundant promise of larger usefulness in the era upon which the world seems about to enter. His keen vision of possibilities centers upon the young cases—many of those may be saved and may be re-created, and restored to perfect health.

It is a disgrace that the children of a vigorous ancestry should in this land of wealth, abundance and opportunity, have degenerated physically until they were only fifty per cent fit to defend the country in its hour of need. It is intolerable that such a condition be allowed to continue. There is but one help for it, namely, to make obedience to the laws of health a rule of life. This can only be brought about by training from childhood up. Our State Departments of Health and Education have this vision in full view and they never before were in such perfect co-ordination to realize this great desire.

May I make a brief personal statement? I would be a strange man, indeed, if I did not appreciate the honor the Chester County Medical Society and the State Department of Health have conferred upon me and upon my family name. I sincerely thank you, and gratefully accept it, with the reservation that I can claim no share in the results shown within the sanatorium enclosure, further than to have recognized the value and the promise of the location, and to have had, without warrant of law, enough courage of my convictions to invite Pennsylvania tubercular sufferers out on to their own land to get relief; and that I helped beg enough money to keep the camp alive during its three years of infancy, until the State adopted and cared for it.

As I look over the State charitable institutions, I can see that this one is especially fortunate. It is located on a great State forest reserve where, as the generations come and go, its inmates will breathe air filtered and purified by miles of living foliage, and drink water from the very fountain heads of streams, as these issue, uncontaminated, from the mountain heart.

LANDSCAPE ARCHITECTURE IN OUR NATIONAL FORESTS AND PARKS

BY S. R. DeBOER

LANDSCAPE ARCHITECT FOR THE CITY OF DENVER

IT is only in recent years that organized effort towards better human development has reached the stage of recreation. Terrible crowding—overcrowding—in our large cities primarily led to the establishing of city parks. They were the necessary outcome of the tenement problems. Man has lived in nature and close to nature until only a few centuries ago. The call of the wild is not extinguished, only weakened in him. Too much crowding by buildings, with their smoke and soot, created a reaction, and he demanded open spaces where he could enjoy nature to a certain extent.

But there was no question of actual recreation involved in the beginning. Lawns were carefully guarded, flowerbeds and trees were for distant observation only. It gave some satisfaction but soon proved to be insufficient. For man, imprisoned in his city walls, lacked more than just the attraction of nature. In primitive life he had enjoyed the freedom of the wilds, his muscles had been in constant use. Now with his rapidly growing civilization, with machinery taking the place of muscular work, his whole physique had weakened and his brains had

grown beyond bounds. He needed more than just a park to look at, and especially did he need it for his children, who, growing up on asphalt streets and concrete sidewalks, missed the open meadows and the forests on the now building-covered farm. And so the park lawns became play meadows—under the trees play areas were set aside. Boating, swimming, skating and all athletic sports entered the once so carefully guarded quiet park scene.

We are in this stage now—the stage of recreation for those who want recreation. Or better, I should say, we are just leaving this stage and passing into the next stage of development. Man, under the pressure of his rapid evolution, in twenty years has outgrown this new idea, embodied in the city playgrounds. Like the original park ideas, it will have its place, will become even more valuable, but it also is insufficient. Leaders of thought have already pointed the way. Universal physical training must become the next step, compulsory physical training like universal mental training already is and has been for many years. And in this system of physical



LOCATING A CAMP

The Wapiti Camp Grounds on the Shoshone National Forest offer much attraction to the lover of the out-of-doors.

training the National Parks and Forests will likely play an important role. And here it is well for us to be thankful for having a government which in its park and forestry policy has already shown itself to be a leader, rather than one which reluctantly drags along the rear end of civilization's procession. To be sure, national parks were set aside as places in which the most beautiful scenes of the country are preserved for posterity, and only secondarily for recreative purposes.

But under the tremendous stimulant of the European war, we have begun to realize that we had not done everything there was in our power to do for those boys of ours who gallantly took up the challenge of autocracy and fought the victory of freedom. We have realized, and very late at that, how large were the numbers among these boys, who were physically unfit to join their comrades and had to be sent back to the homes they had left so enthusiastically. And there is the task we must set to work on now. We must cure these unfit, probably, but more than that we must stop raising the unfit.

Universal training — not for armies, not for killing, but for the higher development of man and woman, is already knocking at the door. In a very few years it will become an established fact.

These few remarks about the growth of our civilization were necessary, in order to better approach my subject. For though our national forests were set aside for economic reasons, be they for lumbering purposes, for water conservation or otherwise, and though the national parks were set aside for the conservation of scenic beauty, they both give the nation service in recreation. I do not want to belittle the work done in developing the economic

value of our forests. Inestimable is the value of the work carried on in this direction, value for the present as well as for the future generations, and still greater good will come from these reserves as the vital point of a nation's health and energy is given a place alongside the economic interests, and great progress in this direction is being made.

Theoretically there is a boundary between the national forests and the national parks. There is a difference of purpose, but to the visitor they are both alike. The national forests contain so many places of scenic beauty that to the visitor it is immaterial whether he is in a

national park or forest. He enters both with the same feeling of reverence and security created by the knowledge that these beautiful spots are protected through him and for him by his government.

There are places in the forests, valuable for economic purposes only. There are others valuable for recreative purposes more than for anything else. And there are large areas valuable for both alike.

Landscap architecture may not have any suggestions for the economic sections;

it does have a few ideas for the recreative areas.

For years the slogan has been in cases of mountain and other wild scenery "Leave nature alone." The landscape architect has been mistrusted in such places—a mistrust probably caused by the number of exotic designs which have been copied and transplanted into our country. There is a fear that if our mountain regions, with their native scenic beauty, are turned over to the landscape designer, he will fill the mountain tops with stone civic centers, with ornamental fountains and maple trees. And still this is an unfounded distrust. For the man, who through his training and artistic development



A COOK WHO TAKES HIS JOB COMFORTABLY

Domestic relations are reversed and it is father who is doing the housework in this little family scene. The picture is taken in the Municipal Camp, Denver Mountain Parks. Such tents may be rented from the city of Denver for \$2.50 a week.

On the Trail

Not the least difficult thing in making the national forest's recreative values utilized is to get people actually into the forest. There is too much rushing through after the style of the auto fiend mentioned by Mr. DeBoer "grinding out the scenery." The photographs shown tell of two things. First, that the need for recreative development is recognized by the United States Forest Service and is being taken care of and, second, this is a step to aid that movement which is gaining greater momentum continually—that is, getting into the forests on foot or horseback so time may be had to enjoy the beauties of nature. These pictures were taken by Supervisor A. M. Cook and show sections of the Pikes Peak Bridle Path, a scenic trail to the top of Pike's Peak. This trail is distinctively a recreative trail, is laid out according to good engineering and landscape principles and fills a long felt want for an attractive and safe route for pedestrian and burro traffic to the top of



the peak. Many other projects along recreational lines are under way but these pictures will give a very good idea of what is now being done and what may be expected along the line of recreative trail work in our national forests.
—A. H. Carhart.





ON THE UNCOMPAHGRE NATIONAL FOREST IN COLORADO
Where the Bear Creek Trail winds like a silver thread around the face of the cliffs.

can create landscape beauty to harmonize in other places, should know enough to properly guide that work in natural surroundings. For development work goes on whether it is studied from an artistic point of view or not, and in places where this point of view might have some value there is no other professional whose line of study and experience fits him better to give advice.

To come back to the "Leave nature alone" idea. What does it mean? What does nature do if left alone? The strongest creatures, be they strong by mere brute strength or by better adapting themselves to their living conditions, the strongest creatures, either animal or plant, will survive and crowd out the others. The willow clump will spread over the open meadow and crowd out the birch, the alder, the honeysuckle and the dogwood. Aspens, beautiful though they are, will

quickly fill the fine meadow you had loved so well a few years ago. Cattle and sheep, for they are included in the "nature" of the slogan, eat and pull the wild flowers to a dangerous extent. Douglas fir and lodgepole pine will cover large areas to the exclusion of silver cedar, yellow pine and other picturesque trees. Mistletoe destroys the pine trees and in general weeds if left alone will soon become pests.

It is well to leave nature alone, as far as it goes. No doubt it is better to leave her alone than to destroy her. But a still better way, and much better at that, is to aid nature along. In places where beauty can be considered—and it seems with our recreation ideas that in places it should be considered—roads should be built—not from the standpoint of utility alone—but should be designed so as to show the best scenic points of the area. A road may lead around the head of a valley, and if there is a snowpeak visible over the length of this valley, nature may be improved occasionally by cutting down a few dozen trees to open up the view. Or the road may lead by a large cliff rock, which until now had been hidden by tall willow growth and could easily be partly cleared and made visible.

Or lookout points can be made accessible by narrow roads or trails. There are a hundred and one objects which may become objects of beauty in such a tract. Open yellow pine forests may become fine camping sites. dense aspen plantings may be made of great interest. some colony of rare plants may even be worth while to lead a road by them. A creek may be crossed at a picturesque bend, or on a large meadow the road kept to one side to prevent the open natural meadow from being cut into two small strips. Beautiful old trees may be



ON THE PIKE'S PEAK BRIDLE TRAIL

A type of trail that is being built by the Forest Service so as to make the forest more accessible to the large number of tourists who visit the mountains annually.

brought into better picture by removing all tree growth in the neighborhood.

There must be sections in the national forests which have little economic and great scenic value and such sections could be treated in this way. Especially near towns and cities or places of easy access from transportation points this treatment could be carried out. In a general way the national parks could be improved this way. Road lines should be laid out with due regard to engineering problems of course; poor grades and lines are inexcusable no matter how beautiful the scenery. After the roads are built a skeleton of the park is there, and the work of encouraging nature can begin. In places where wild flowers have been largely destroyed through

bines are already becoming scarce, and if you have seen the auto loads of these flowers taken from their shady nooks to be wilted away in some tourist's care, this will not surprise you. If our national parks are to fulfill their primary purpose of preservation, they must be saved from the danger of overcrowding, and this again can be best done by putting at the disposal of visitors other areas outside of the real gems we want to save.

I should like not to be misunderstood on this point. These parks should be for recreation and recreation of the masses. I would even willingly sacrifice the last flower, be it columbine or painter's brush, or Mariposa lily, if these flowers aided in adding interest to the life of some poor tenement child. But it is not these very



OBSERVATION POINT ON PIKE'S PEAK.

Looking down Ute Pass, in the Pike National Forest, from the automobile highway, a magnificent panorama spreads out before one.

natural processes or by tourists, they can be reintroduced by sowing their seed. In other places where the flower varieties are limited or crowded out by undesirable weeds the former can be encouraged by keeping down the weeds and plants which are not wanted.

To a certain extent these recreative areas in the national forests have an advantage over the national parks. For we must not forget that the recreational work is as much a sideline for the national park as it is for the forests, and that the parks were not created for the monetary benefit of hotels and transportation companies, but primarily to preserve their unique scenic beauty to posterity. There lies a danger in too great a popularity for these parks. In some parts of the Rockies wild colum-

needy we bring out by extensive advertising, and expensive hotels. They only attract the leisure class, the class which can enjoy nature everywhere on earth, who sit on hotel porches and have the scenery brought down to them at so much a dozen.

Easy transportation to our nature reserves for those who need them the most is the essential problem in this respect. Cheap transportation; auto roads, well built, are of immense value. But not even they reach the poorer class. And there again is the danger of the auto fiend, who grinds out the scenery at so many miles per hour. He can pass the same road a dozen times and never notice the little beauties you had anxiously preserved, but also never failing to grumble over the little



THE SKIING COURSE, GENESEE MOUNTAIN, DENVER MOUNTAIN PARK.

This exhilarating sport calls for much practice before perfection is attained and lots of fun is had by the amateur and at his expense.

hole you forgot to fill at some bridge approach. Main trunklines for autos are of the greatest importance, but I do think that great good could be done by building secondary roads with limited speed and trails for those who prefer a slower way of enjoying the views.

As a counterweight against expensive hotel rooms, auto camps have come into existence. Rather than be locked up in a hot stuffy room like the one he left in Kansas, the visitor of these camps will camp out in the open. And he shows much more appreciation for our scenery and, for this reason if for none other, should be encouraged.

This last fall, while roaming through the yellow and golden aspens, the green firs and pines, the red and purple scrub oak of our Pike National Forest, the thought occurred to me how many frail bits of young humanity, now starving for air and light and interest in life, could be grown up to sturdy citizens in the invigorating air of the Rockies. Instead of growing pale in the shadows of the metropolis, instead of being nerve shocked little victims of rapid transportation systems or weak-kneed, vice-ridden alley inhabitants, they could be

brawny, tawny, husky youngsters of the woods. Camps for children, camps for convalescents, camps for all people who want to enjoy the mountains and cannot afford the expensive hotels seem to me the logical followers of the auto camps. These camps should not be crowded together but scattered along lines of transportation which are cheap and able to handle large numbers of passengers. They should be within visiting distance perhaps of places of natural grandeur, but should not be close to them no more than any hotel, no matter how expensive it might be, should be allowed to create a false note into the well conserved beauty of the place.

To come back to my title, landscape architecture then can aid in those parts of the national forests and parks where aesthetic values are to be considered and where recreation can become part of the general policy. In addition to this it can be of service in applying town planning principles to laying out summer colonies, camping grounds and the like. And last, but not least, it can be of aid in preserving wild vegetation and in encouraging rare plants which, under civilization's foot, would soon disappear.

FORESTERS EDITION

For the benefit of foresters and lumbermen, and also others desirous of technical and semi-technical articles on forestry, a Foresters Edition of AMERICAN FORESTRY will be published each month.

This edition will contain technical and semi-technical articles in place of the more popular articles on birds, shade trees, memorial trees, etc.

Members may have whichever edition they wish. The main edition will be sent as usual to those who do not notify the Editor that they wish the Foresters Edition.

NATIONAL FOREST PLANTATION UPON PIKES PEAK

BY SMITH RILEY, DISTRICT FORESTER, DENVER, COLORADO

YOU have heard the story of the man who saw a little child clapping her hands and jumping with joy near a small tree. The man called the mother's attention to the child's happiness, whereupon the mother said: "She may well be happy because it is the first tree she has ever seen."

Imagine your world without trees. Think of those areas in which you delight without trees. Or better still, think of those mountain areas with which you are familiar where fires have completely killed all forest growth. The thousands of people who visit Estes Park in Colorado

idle is said to be sixty-five million dollars. No large sums have been made available by Congress to reforest the denuded lands within the National Forests, so that the acreage planted each year has been extremely nominal and the work is of an experimental character.

In picking the areas in the National Forests where planting is to be carried on, extremes of conditions have been sought so that this early, restricted reforestation would in the years to come serve to point the way in carrying out more extensive operations. One of the areas chosen lies upon the slopes of Pikes Peak in Colo-



PLANTING IN ROCKY COUNTRY

Denuded country near Pikes Peak Auto Highway planted with yellow pine in 1912. This picture shows the rough character of a greater part of this country. Old snags of the former timber stand among the rocks.

each year are familiar with the extensive burns upon the east slope of Long's Peak. Can anything be more ghastly than the path of one of these consuming fires? It is the wiping out of all life which impresses one. It is like the battlefields of France. Passing through one of these burned areas is depressing in the extreme to many people who see upon all sides the skeletons of once superb tree life bleached white by the action of winter storms.

It is estimated that out of the 160 million odd acres of National Forests there are seven and a half million acres in need of planting or seeding to re-establish tree growth. The yearly loss to the nation in forest products from lands suited only for the production of timber and now

rado and includes the fire denuded portions of those watersheds from which several towns, including Colorado Springs and Manitou, secure municipal water. A reconnaissance study has shown there are some twelve or fourteen thousand acres from which the forest growth was swept by fire in the early days before the growing demand for water brought realization of the high value of tree growth as a water conserver. In addition to the forest products which can be produced from the lands and the value of the tree growth as a water conserver, there is the high value of establishing trees eventually to heal the ghastly fire scars upon the mountain slope, as Colorado Springs and Manitou, two cities closely related to

each other, represent one of the greatest tourist centers in the West today.

The conditions of the locality were severe for planting. The uneven distribution of moisture, high dry winds of spring and summer and also in winter when the temperatures are low, the lack of soil over much of the area and the movement of the soil on the steeper slopes made up these difficulties. The soil, composed of large particles of gravel, comes from the decomposition of



FIR AND ASPEN

Douglas fir planted in 1904 under aspen in a bottom and on a north slope near Pikes Peak Auto Highway. The aspen protects the fir until it has become established, after which the fir pushes through the aspen and crowds it out.

coarse-grained granite which forms the mountain masses of the Pikes Peak group.

A careful study of the reforestation problems upon Pikes Peak was made by Mr. W. J. Gardner in the summer of 1903. This study was very complete and weighed the difficulties to be overcome in successfully establishing tree growth upon the barren slopes. One very interesting point brought out in this study was the date of the fires which devastated such large areas in the vicinity of Colorado Springs. From the age of the young tree growth and the scars upon trees injured by fire and yet not killed, Mr. Gardner determined that a greater part of the area devastated had been swept by a conflagration or a series of fires between the years 1850 and 1853. This date is interesting as it shows the time which has elapsed since the destruction of the forest growth and how slow must be the return of forest growth to such lands by natural means. In short, the high demand for all waterflow from the area and the recreational use then being made and that which can be expected in the near future, combined with the value and

use of all forest products grown upon this potential forest land so immediately accessible, justified not waiting for natural reproduction but establishing such growth by artificial means.

The first move was made in the choice of two areas for nursery sites where the trees for field planting were to be grown. Thinking it was best to produce the trees under the same conditions in which they were to be planted, two nursery locations were chosen high on the big mountain, the land cleared, shade frames erected and seed sown. This work was begun in the spring of 1905. This same year 50,000 yellow pine seedlings were brought in from the Halsey nursery in Western Nebraska and planted in Clementine Gulch, about two and a half miles from one of the nursery sites. There are no records to show what weather conditions prevailed at the time or followed this planting. A careful search over the area in the fall of 1907 resulted in the discovery of but one seedling alive. The reason for this practically total failure was given as largely due to the fact that seedlings raised at Halsey were not able to withstand the sudden change to the higher altitude. It was proved later that seedlings

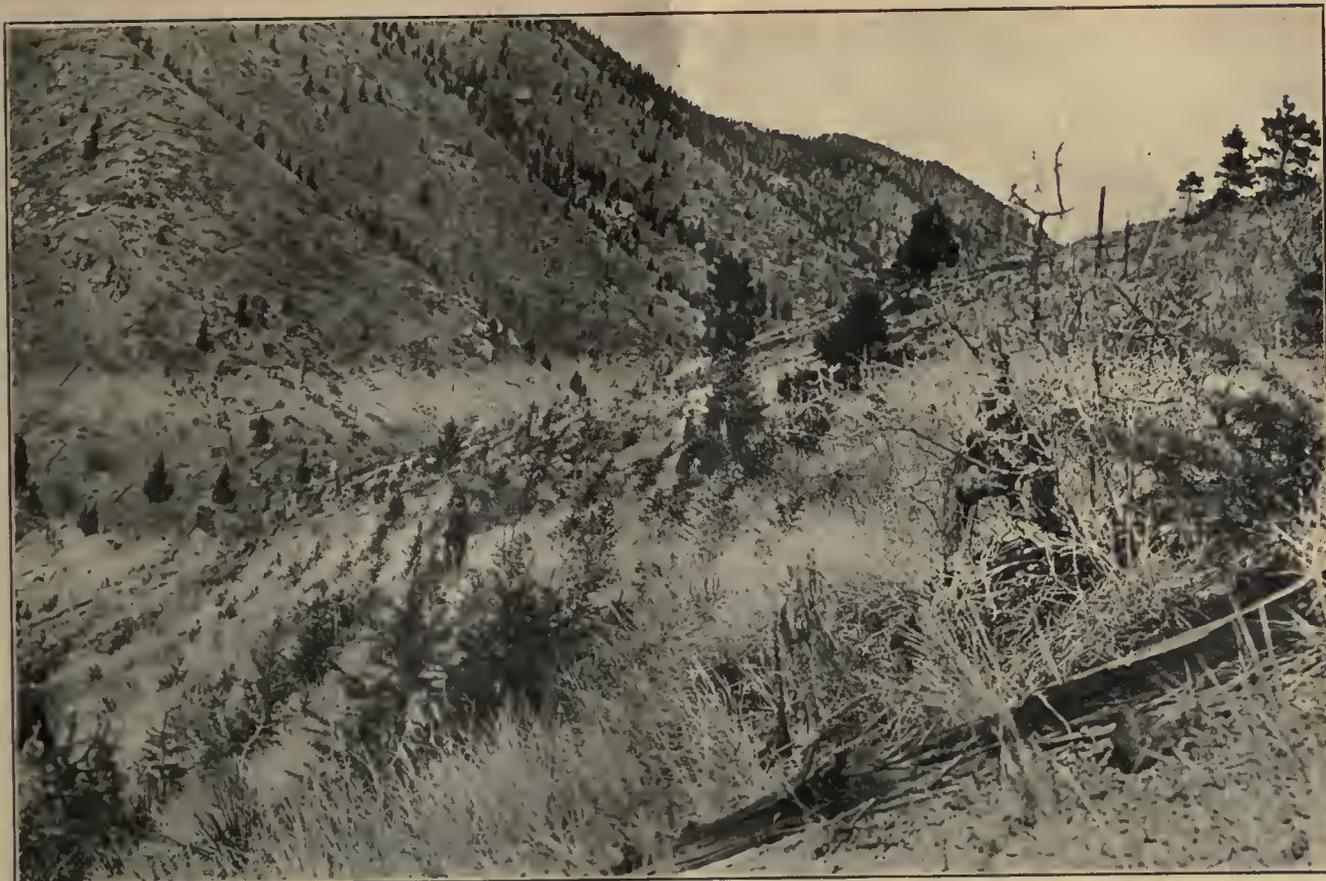


THRIFTY PLANTED YELLOW PINE

More of 1912 yellow pine along Pikes Peak Auto Highway. Trees now thoroughly established and prepared to push out rapidly.

of any sizes or from any other localities with markedly different climatic conditions, were not strong enough to survive the rigorous conditions found here; that, in fact, it would take transplants of the more vigorous type to produce results.

Experiments with the nursery areas chosen showed beyond a doubt that while there was some advantage in growing the plants under the same conditions in which they would be set out, many points which would offset



A DOUGLAS FIR PLANTATION

Douglas fir planted in 1906 in Bear Creek Canyon near Colorado Springs. Averages 3 to 5 feet in height. The scattering growth of jack and yellow pine on the opposite side of the canyon has been sixty years coming in naturally.



TREES WILL GROW HERE

Yellow pine planted in 1912 near Pikes Peak Auto Highway. Stub of Douglas fir in center, and rocky outcrops show in many places. Yellow pine makes a slow growth at first but once established it grows rapidly on the proper site.

this advantage would be gained in having the nursery located at a lower altitude where more vigorous plants could be produced in the longer growing season and the trees be dug and placed upon the planting areas as soon as weather conditions made spring field planting possible. The Monument nursery site was chosen and developed in the spring of 1907 as a result of the two years' experience with the other two small sites. The Monument site has proved satisfactory and is now producing the large amount of yellow pine, Douglas fir and Englemann spruce, and the small amount of limber pine that are now being planted yearly upon Pikes Peak.

Following the 1905 field planting, further seedlings of Douglas fir were brought from the Halsey nursery in the spring of 1906 and planted in the Bear Creek region with a little better success as the 1907 counts on this small planting showed thirty-five per cent alive.

In the early operation of this field planting, a study

Up to the close of 1917 some 4,575 acres have been planted on the Pike National Forest, for the most part in the Colorado Springs region and in the vicinity of the famous Auto Highway to the top of Pikes Peak. An additional thousand acres are also being reforested in this vicinity this spring (1918). Fully eighty-five per cent of the area which has been artificially planted to pines and spruces can be considered as successfully stocked with trees. Such losses as have occurred are due principally to the planting of Austrian pine, a species which is here out of its habitat, and to the undertaking of planting work in the fall. While fall planting may succeed in regions where there are early and abundant snows, such conditions cannot be depended upon along the eastern slopes of the Rocky Mountains. The principal species planted are yellow pine on the lower foothills, which in turn gives way to Douglas fir and Englemann spruce on the higher slopes, limber pine being



PLANTED OLD BURNED-OVER GROUND

Showing regular rows of planted trees along Pikes Peak Auto Highway—1912 yellow pine to the right of the road—1914 yellow pine and Douglas fir to left. This country was burned over from 60 to 65 years ago and in that time very little reproduction has come in. Thousands of tourists motor over this road to the top of Pikes Peak annually.

was made and a map completed showing the extent of the types which should be planted with the different species of trees which grew originally upon the areas. The first experiments were made at the lower altitudes with yellow pine and Douglas fir. In the more recent years the production of Englemann spruce and limber pine for the high planting types has been taken up. The low percentage of survival in the earlier plantings showed the need of the most vigorous transplants that could be produced, and this was secured in the 2-1 plant, as leaving the tree two years in the seed bed gave a plant readily handled in transplanting, while the one year in the transplant bed produced a well developed tree with a clustered root system made up of fine rootlets of much greater area than that of the tree crown or evaporating surface.

used for windy, exposed regions. The trees are planted 8 x 8 feet or about 700 per acre, and the average cost of planting, including the cost of producing the trees at the nursery, is approximately \$11.00 per acre, which is very moderate when we consider the rugged and rocky region in which the reforestation work is being carried on. Generally speaking, it may be said that the annual survival of trees varies from 60 to 90 per cent, depending upon the condition of the soil and the species planted.

When planting was first projected there was little public interest or sympathy for the work. The slow growth of the trees and the slight showing each year had much to do with this lack of enthusiasm on the part of the layman. In fact, in the early plantings complaint was made (though scrupulous care was taken to guard against it) that in planting these watersheds the pres-

ence of camps for the planters would pollute the water of the cities using it for a municipal supply. One prominent citizen spoke with ridicule of the project, claiming it was absurd to spend the people's money for reforestation above an altitude of seven thousand feet because above this altitude the growth was so slow that such plantings could never be of value. Now that the trees show well over the plantations, there is nothing but hearty approval for what has been accomplished. Those

people who are locally interested in seeing the gradual growth of these trees, which have been planted artificially in order to heal the ghastly scars on the slopes of Pikes Peak, to render these worthless areas productive and ensure an abundant supply of water where every drop is worth its weight in gold—I say, those who see these things realize that an excellent work has been accomplished and is being carried forward for the benefit of the public.

THE FEDERAL INCOME TAX AND THE FOREST INDUSTRIES

BY MAJOR DAVID T. MASON

FOREST VALUATION EXPERT OF THE U. S. TREASURY DEPARTMENT

THE Federal Income Tax Law in its present state is a gigantic factor suddenly injected into American business affairs.

It was not until 1913 that an amendment to our Federal Constitution made a Federal income tax lawful. For four years before that time there had been an excise tax on corporations based on income. This tax and the new income tax took only one per cent of the net income of corporations for the years 1909 to 1915. For 1916 the tax rate increased to two per cent. These rates were so low that business was only slightly affected and paid little attention to the tax.

With the coming of the war, however, huge amounts of money were required by the Government for immediate use. The income tax rates for 1917 and later years were greatly increased to secure a large part of this revenue. The year 1913 saw sixty million dollars paid in income taxes; for 1917 the amount had been increased to fifty times as much and three thousand million dollars were collected. From an insignificant factor in its effect upon the affairs of business and individuals the income tax had suddenly become of enormous importance. For one group of lumber companies the income tax now takes approximately fifty per cent of the net income. In many individual cases the tax amounts to considerably more than fifty per cent.

We have emerged from a great war with a national debt so huge that a billion dollars will be required yearly to pay the interest; an additional large amount will be needed to reduce the principal of the debt. The annual expense of the Federal Government before the war amounted to a billion dollars and an increase has taken place since that time. Prohibition has removed one of the important sources of Government revenue. Thus it is clear that the income tax will be an important factor in the business affairs of the United States for many years to come. Business men in all their plans for the future must take the income tax carefully into consideration. It is, of course, the policy of the Government to adjust the income tax so that, as great a burden as it must necessarily be, it will cause the least inconvenience. In order to deal with the whole situation in the most intelligent way the Bureau of Internal Revenue has secured the aid of specialists in framing the original revenue bills and in drawing up the regulations under which the

new revenue laws are being administered. The present income and excess profits tax law presents unusual problems in the case of certain industries such as those engaged in the production of mineral, oil, gas and lumber, which use up natural resources as they operate. The law recognizes as *property* free from tax the value which such resources had on March 1, 1913, the date upon which the Federal Constitution was amended to provide for an income tax; all increases of value after that date are treated as net income to be taxed in the year in which the income is realized. This problem involves the careful determination of the quantity of the natural resources owned on March 1, 1913, and the unit values of such resources at that time.

To deal with this and many other vital but less important problems the Natural Resources Division of the Bureau of Internal Revenue was organized in 1918. At first engineers were appointed to deal only with the affairs of the oil, gas and mining industries. In the spring of 1919, largely at the request of the forest industries, the Timber Section of the Natural Resources Division was organized to handle these problems in their relation to timber. To deal intelligently with the situation, the staff of the Timber Section includes a group of forest engineers individually familiar with the more important forest regions of the country such as California, the Douglas fir region, the Inland Empire, the Rocky Mountains, the Gulf Coast Pine region, the Lake States, the Atlantic Coast Pine region, the Hardwood region, and the Northeast. In order that the regional forest valuation engineer may have the data upon which to act, it is necessary to secure from each individual taxpayer of the forest industries a statement describing in detail his timberland, his plants, and his operations during recent years. For this purpose a questionnaire is now being distributed to the taxpayers. This questionnaire will gather data relating to the kinds and quantities of merchantable timber and young growing timber owned, the prices at which it has been sold in recent years, the average cut per acre in different regions, the losses of timber from fire and other causes, the extent to which forests are protected, the rate of growth of the old and young timber, systems of forest management used, the character of the manufacturing plants, the kinds and quantity of lumber produced each year, and many other important matters.

FORESTRY AND PATIENCE

BY QUINCY R. CRAFT, U. S. FOREST SERVICE, DENVER, COLORADO

“ONE soweth and another reapeth” is perhaps never more true than in the work of the forester. For not only in awaiting results of physical effort, but also in inducing the public to adopt methods which look to the future, patience as well as science is requisite. How often timber holders who undertook to handle their lands under forest working plans prepared in co-operation with the Forest Service abandoned the purpose until it seemed that for the present the practice of forestry on a large scale must be limited to Government and State work!

The first working plan for Government forest lands

after two decades, we find an enduring demonstration of the benefits of conservation worked out in detail in the conditions of employment and daily life of those affected?

The example to which reference is made is the lumbering operations of the Homestake Mining Company, centered at Nemo, South Dakota. A well-equipped logging road connects the sawmill with Company, State and Government-owned timber tracts, on the one hand, and the market, on the other, and all operations contemplate thirty years, if not an indefinite run. Assurance of continued employment promotes efficiency and thrift, and



FINE EXAMPLE OF CONSERVATION

Area cut over by Homestake Company under combined shelterwood and selection system of marking. The timber cut has been completely utilized and a stand of thrifty growing yellow pine is left.

and one of the very first for any large timber tract was prepared in the vicinity of Nemo, in the northeastern Black Hills of South Dakota in 1898, by Henry S. Graves. A picture of a part of this area in which young growth had been preserved and fire protection, facilitated by a good clean-up was used on the first Forest Service calendar. An enlargement hangs in many supervisors' offices, and it has been used more generally for lantern slides and newspaper illustrations of good forestry in America than almost any other.

Is it significant that in this very part of the Black Hills

the type of men and the manner in which the work is conducted indicate that hardship and reckless daring are not necessarily connected with lumbering.

Nemo and the small valley in which it lies are very attractive for a permanent lumber camp; buildings are kept in good repair, and large pines are carefully protected to provide a natural park in the center of the town. The company store is well kept and carries goods of quality and at prices that prove advantageous to Forest officers whose location enable them to buy there. The proverbial isolation of the lumber camp is relieved by



MEADOW OF ALFALFA SURROUNDED BY WOODED HILLS

This affords variety and profit to purse and health of combining farming and timber work. Our forefathers in the East had, along with the hardships of pioneering, the advantages of a plentiful supply of timber close at hand, and the Black Hills farmer is similarly favored.



FORESTRY AND FARMING GO HAND IN HAND

This scene at Nemo shows a fertile alfalfa meadow in the foreground. In the background, slope lightly thinned for scenic beauty along auto highway. Good clean-up and disposal of brush and abundant reproduction where sunlight is sufficient.

local entertainments of a literary nature; children are schooled; the men and women look well and happy.

With anticipation of continued use it was practicable to install a model sawmill plant, of larger capacity than is required for present needs, and the men have diversity of work by sawing forenoons and then sweeping up, and sorting, and planing lumber the rest of the day. Logging is done year after year by contract by the local ranchers to splendid advantage as supplemental to their farming. Black Hills conditions, suitable to the natural seeding of a new crop of trees and for the rapid growth of the young trees, also favor the practice of forestry.

The sawmill is owned, and furnishes the timber required by the Homestake Mining Company, of Lead, South Dakota, in which Mrs. Hearst owns a controlling interest, and in which employees have been encouraged to buy shares. The Homestake conducts its operations on a conservative basis, having ore blocked out for mining for many years, and drawing on the richer ore only to an extent that will maintain a dependable rate of dividends indefinitely.

It might be said that such methods will not meet the

requirements of present day competition which drives operators, regardless of personal desire, to handle every operation on the closest margin, and as quickly as possible to release the capital invested to be used in other enterprises; that without the gold mine back of it, such timber operations would lose money.

Yet the Homestake Mining Company is wise and far-sighted enough to see that it will need timber for a long time; and that good conditions of employment are better than an ever-changing force and early-aged pensioners from accident and overwork.

There seems to be a minimum of lost motion and waste. Systematically orders are given in advance for the materials needed, and the timber is so sawed. Thus there is very little stock on hand to deteriorate, be endangered by fire, and accumulate interest on cost of manufacture.

When through a more excellent understanding wood consumers generally can be brought into closer touch with producers, distribution improved, and utilization perfected, will not present demands on lumber producers be lessened and the practice of forestry be made easier?

DuBOIS TO ENTER CONSULAR SERVICE

FROM California comes the news that Lieut.-Col. Coert duBois, United States Forester in charge of the California District since 1911 (with the exception of one year spent in France), has received an appointment in the United States Consular Service, and his retirement from the Forest Service has been announced.

As the leader and organizer of the most comprehensive fire-prevention service in existence in the West, and particularly as the principal opponent of the so-called "light burning" theory of forest protection—a theory which has cost California tremendous sums annually through the destruction of timber by fire—duBois has made a remarkable record in this State.

During the war he served as a major with the Tenth Engineers in France, returning just a year ago this month with the rank of lieutenant-colonel, and the task of aiding in organizing new engineer units for overseas duty—a task which was brought to a close by the armistice.

"I am particularly pleased at the marked change during the past two years in the attitude of the people of California toward forest fire prevention," said duBois, in discussing his retirement.

"The main job of the United States Forest Service here has been putting across to the public the knowledge that the future supply of timber so essential to the big agricultural and industrial development of the State—a development which is now well under way—depends first and foremost upon the protection of the young growth in our forests from fire.

"Fire prevention and protection is, and has been, one of California's vital issues. Yet a few years ago this fact was so little realized that forest fires—both those wantonly set and those started by sheer carelessness and indifference—were viewed with amazing unconcern.

"And the one greatest contributing cause to that unconcern was the pernicious, ill-advised and destructive 'light burning' theory—a theory which advocated the deliberate setting of forest fires in the spring and fall with the idea that the undergrowth and down logs might be burned out without damaging mature timber or reproduction, and thus make the forests immune from fires during the summer months. This theory—which is practically abandoned in California today—was based on the erroneous assumption that our forests have persisted *because of* the many fires that have been started in centuries past by lightning, Indians and the early settlers. As a matter of fact, our forests have persisted *in spite of* such fires—and their depleted stand today is the result. Continue to apply the 'theory,' and fifty years hence would see no forest at all in California."

Lieutenant-Colonel duBois entered the Forest Service in April, 1900, as a "Student Assistant" at a salary of \$25.00 per month and found. His first administrative job was earned in 1904, when he was placed in charge of the section of "Boundaries"—a division of the old Bureau of Forestry which determined the location and extent of the various National Forests in the Western states. In 1905 he was made Inspector for the Rocky Mountains and Southwestern Sections, and was appointed Associate District Forester for California when the California District was created in the winter of 1908.

He assumed the leadership of this district in 1911, following the resignation of F. E. Olmsted.

Colonel duBois' appointment in the Consular Service was confirmed by the Senate on September 5 and he has left for Washington. His successor, who will be appointed by Forester H. S. Graves, at Washington, has not yet been announced.

A NATIONAL FOREST POLICY

AMERICAN FORESTRY MAGAZINE HEREWITH PUBLISHES SOME MORE OPINIONS REGARDING THE NEED OF A NATIONAL FOREST POLICY AND THE KIND OF A FOREST POLICY PROPOSED BY UNITED STATES FORESTER HENRY S. GRAVES. COL. GRAVES' OUTLINE OF THE PRINCIPLES OF SUCH A POLICY WAS PRINTED IN THE AUGUST ISSUE OF THE MAGAZINE AND A FURTHER OUTLINE IS PUBLISHED HEREWITH. FORESTERS, LUMBERMEN AND TIMBERLAND OWNERS THROUGHOUT THE COUNTRY HAVE BEEN INVITED BY THE AMERICAN FORESTRY ASSOCIATION TO EXPRESS THEIR VIEWS ON THIS VITALLY IMPORTANT SUBJECT.—EDITOR.

FOREST ECONOMICS

BY H. H. CHAPMAN

EX-CHIEF OF SILVICULTURE, DISTRICT 3, U. S. FOREST SERVICE, AND DIRECTOR
AMERICAN FORESTRY ASSOCIATION

NO well informed student of forestry denies the fundamental principles of economics in determining forest policies. A forester who confines himself to the contemplation of methods of raising trees and ignores the reasons for producing them is about on a par with a foreman whose only knowledge of a business is that of the process of manufacture compared with the business manager whose responsibility it is to make the business a success by supplying demand through the co-ordination of the processes of production, transportation and marketing.

As the Secretary-Manager of the National Lumber Manufacturers' Association, Mr. Compton states the following fourteen points which, shorn of quality verbiage, stand forth as the platform on which his discussion is based:

1. Cheap and plentiful timber and low prices for lumber are not necessarily any benefit to the public.
2. Destruction of the original forests of the United States without provision for forest renewal is not necessarily a national misfortune.
3. The fact that forests are being destroyed faster than they are being replaced by growth does not of itself signify public loss.
4. The virtual disappearance of our best timber trees is not necessarily detrimental to public welfare.
5. It is not even probable that the lands better suited for growing trees than for growing anything else should be so used.
6. The disappearance of forest industries because of exhaustion of timber supplies is neither a local nor a national misfortune.
7. The original timber in the United States should be treated as a mine and not a crop, and no effort made to renew it.
8. The loss of employment for labor caused by vanishing forest industries is not an evil.
9. The idleness of cut-over lands is an evidence that the maintenance of permanent forests upon them is poor public economy.
10. The idleness of cut-over lands is also a proof that it is poor private economy to grow forests on them.
11. There is no obligation whatever resting on the owner of forest lands to use them to grow timber.
12. While admitting that the owner of property should not use it to do damage to other property, we deny that he must so use it as to benefit others.
13. If the public wants more forestry than enlightened self-interest dictates, the public must pay for it.
14. Although the maintenance in idleness of cut-over land is justified, yet we admit that these lands should be protected from fire and in spite of the foregoing thirteen points, we believe that this measure is necessary in order that timber may be grown on such lands.

By comparing the above version of the fourteen points with the original statement by Mr. Compton, it will be seen that the wording has been slightly changed so that the writer lays himself open to the charge of misinterpreting these points. On the contrary, it is in an endeavor to

clarify them and state their exact meaning that the points have been so restated.

From Colonial times the basic, economic conditions surrounding our national forest resources have been such that over 80 per cent of our forests have passed into private ownership. What has been the result of this policy? The fourteen points are an answer. The economic conditions surrounding the lumber industry as it has been conducted in this country are such that the National Lumber Manufacturers' Association voices through Mr. Compton the basic belief of this industry, to the effect that the *production* of timber as a business for private capital has been impossible in the past and will practically remain so in the future. Further, that forest lands now in private ownership must largely, if not wholly, remain unproductive of timber. This platform is justified by a series of economic tenets which, stated baldly, are a most remarkable sub-version of what every other civilized nation in the world considers sound economic policy.

In an effort to justify the stand taken by the business interests engaged in lumbering; namely, that under no conceivable circumstances should the industry be required to take an active interest in the renewal of its raw materials, this economist endeavors to prove that there are practically no public interests which would indicate the necessity for forestry on cut-over lands. Having thus undermined the very foundation of forestry; namely, the need for it as a matter of public economics, it then becomes much simpler to drive home the point that if the public is so foolish as to demand forestry, they must in all reason pay the entire cost of the bill.

What is the matter with these fourteen points?

1. No one has ever claimed that the perpetuation of virgin forests is a wise use of public resources. Growth in the virgin forest is nil. Only by a proper removal of the over-mature timber can the actual increment on any area of forest land be brought into the plus column permanently, but unless the virgin stand is cut in such a manner as to secure natural reproduction, or unless this cut-over area is planted, the growth on the cut-over lands is also nil.

Cheap and abundant supplies of fundamental necessities of life cannot be considered as a public calamity nor is there any possible danger that an abundance of second growth timber will in any way interfere with the production of any other form of public wealth.

2. Classification of land was originally proposed by foresters. It is the interests who own cut-over forest lands who are most active in opposing this fundamental economic need. The use of agricultural land for agriculture is an axiom. The use of

non-agricultural land for agriculture is a public crime. The contention that any forest economist has ever advocated the renewal of all forests regardless of the character of the land is a mischievous mis-statement. Opposition by private interests to the proper classification of worthless agricultural lands as forest lands has been determined and far-reaching.

3. The greatest prosperity is found in the multiplying of industries and not in their elimination. To say that the elimination of forest industries is a public benefit because capital may be profitably employed elsewhere is an argument which could be applied to any other industry and is fundamentally wrong.

The statement that the less wood the nation consumes per capita, the better off they are, would be along the same line as the foregoing. We use less wood because we are unable to afford more, just as we cut down on food and clothes for the same reasons. The cheapness, serviceability and usefulness of wood will continue to be desirable and its consumption in large quantities would be a public benefit were it possible to produce wood in adequate amounts.

4. The virtual disappearance of the more valuable timber trees is a public calamity which cannot be overcome by the substitution of inferior species or of metals and other materials. The ability to choose from several substitutes tends to keep down the prices and increase supplies. With wood eliminated, prices must rise and conditions of life become harder.

5. The amount of land which should be devoted to forestry will be determined as much by the need for timber as by the suitability of the land itself. At present land producing 97 per cent of our annual timber cut is being managed so that this production will largely cease in the near future. If it were true that in the future there were any probability that such enormous areas of land would be devoted to producing timber as to seriously reduce returns from agriculture or from any other form of the use of the land, public policy and private interest would dictate the reclassification of some of this land and its devotion to the more needed public utility. Then what should be our policy with regard to this timber land?

6. Where clearing paves the way for a more profitable use of land, that land has been so used except where this development has been prevented by speculation on the part of the original land holders. Where clearing of non-agricultural land has paved the way for forest fires and desolation instead of the continuance of a productive enterprise, the question as to whether public economy is best served is one which cannot be answered off-hand by the statement that the capital required to protect these lands and continue them as forests is better employed in some other undertaking.

7. It is conceded that the lumber business is *not* the business of growing timber. Foresters and economists have realized this from the start. The lumber business therefore treats the forest as a mine, utterly ignoring the fact that it is a crop. Men who buy timber and operate sawmills are not foresters. Yet, through the fact that they are owners of timber land, many of them assume to know more about forestry and forest economics than do the foresters themselves, and because the business of forest production is little understood by them and would involve a line of activity and investment outside of their own business of lumbering, their attitude has been consistently one of pessimism towards those who are attempting to establish the business of forestry on an efficient basis.

If it is true that timber production is distinctly a public enterprise, it must follow that it is a necessary undertaking and that without it the public interests will be seriously injured. Why then is there not a more intelligent advocacy of forestry by those who come the nearest to it; namely, the lumbermen whose business will disappear on the disappearance of the forest resource? The answer is that they have feared that the public will require them to conduct this business and to conduct it at a loss.

8. Local shrinkage of employment for labor, necessitating the transfer of the laborer, his family and his investments, to other fields may result in his securing higher wages, but strikes at the basis of economic stability and independence. Do we prefer hobo labor or laborers who own their own homes and are members of a stable community? Is the increasing scarcity of raw material a benefit because it forces laborers to move from one locality to another or would the maintenance of a supply of raw material be of greater benefit to these laborers?

9. If lands cleared for timber are better suited for agricultural, stock raising, or other purposes, they will eventually be used for these purposes in the absence of the speculative handicap of high prices often imposed upon such lands by private owners who have stripped them of their timber. Since they are unsuited to forestry or better suited to other purposes the loss does not consist in their lack of use for forest production, but in their being withheld from the use to which they are best adapted.

10. The idleness of privately owned cut-over lands fit only for forestry has long been held to be an economic necessity on the

part of the lumber operator for the reason that he cannot persuade himself to risk the use of these lands for the only purpose from which he can ever obtain an adequate revenue; namely, the production of more timber. Idle cut-over forest lands which cannot be forced on the market for agriculture or grazing are a dead load in the owners' hands. Foresight would have enabled these owners to have created values in growing timber with small cost to themselves and these values would carry the land. This point of view these operators have stubbornly refused to admit since they are not in the business of raising timber and since the traditional policy of operators has been to regard the land, after stripping it of timber, as a liability. The measures which might have been taken to preserve small timber and secure reproduction have not been taken. For this reason alone these forest lands are idle and waste and are an economic problem of staggering immensity in most cut-over areas.

11. The average owner of private property in timber lands has so far made but little conscientious effort to determine whether or not it would pay him to try to maintain the forest productivity of these lands. The fact cannot be successfully disputed, that such owners are usually not interested in the possibility of growth, regarding it as so impractical that they could not even waste the time required to consider it. After the cutting is completed, it is useless to take up the proposition since the real opportunity lies in so handling the original cut as to leave favorable conditions for the second cut.

12. The principle that no damage should be done to another's property, while admitted in the fourteenth point, has not been recognized in practice. Forest lands of the United States have been stripped of timber regardless of the effect of this clearing upon erosion, stream flow and irrigation, nor have adequate measures been adopted to prevent this misuse of private property. The further extension of public control to prevent the unnecessary devastation of a source of materials necessary for public welfare will bear discussion. It is not sufficient to say that private owners should be required to undertake no expense whatever to preserve the productiveness of forest land.

13. This point would be well taken if economists agreed that self-interest is always enlightened. It has been the conviction of forest economists for many years that the self-interest of the average operator who is also an owner of forest land has been anything but enlightened, and that the policies which he has pursued, while apparently indicated by economic necessity, have insured the destruction of his business in the least possible time; and where he has been able to secure enough privately owned timber to make his business last for fifty years or more he has found himself staggering under a load and burden of raw material far in excess of the carrying capacity of the business. The lumber business is best conducted when free from this load. The management of forest land should be a business in itself. Enlightened self-interest of forest owners is most apt to be displayed in those who have no connection with the manufacturing end of the business, for when an owner really intends to keep his forest lands permanently, enlightened self-interest will dictate the policy of preservation of the source of income from that land.

14. The author of the fourteen points admits that there is a limit to the policy of "the public be damned." Cut-over land may remain in idleness if private owners do not see fit to have it otherwise, but these same private owners must be required to protect that land from fire or to assist in doing so. The expense thus incurred is not assumed to be for the purpose of benefiting the owner since it has been conclusively shown that these benefits are visionary. Yet fires must be kept out in order that the land may naturally restock itself. Why?

We agree that fire should be kept out in order to assist at natural restocking and that this is the most obvious of the measures which should be undertaken to prevent the "complete ruin of 80 per cent of the nation's forest resources. Is this all that should be done? The mere prevention of fire will, under some circumstances, secure restocking of a satisfactory character, but this is not assured unless favored by other factors, familiar to foresters and those who understand the business of forest production.

To accept such a platform would be to make us a laughing stock for the civilized world. The use of lands unfit for other purposes, for the production of supplies of raw materials is so fundamental a proposition and so universally understood in Continental Europe that it is no longer even debated.

When the time comes that owners of forest lands, unfit for other purposes, recognize that it will pay them to devote these lands to their proper economic use as speedily as possible, this problem is going to solve itself. It will

not be solved by a denial of fundamental economic facts or through perversion and distortion in order to justify false economics invoked with intent to avoid this logical conclusion.

CLASSIFICATION OF LANDS AND OUR FOREST POLICY

BY GEORGE DROLET

THERE is no question, but that the oral and written discussion, usually in agreement concerning the vital need of a national forest policy, is bearing fruit in important suggestions and criticisms looking to a forest policy safeguarding the present as well as future generations.

The article appearing in the September issue of *AMERICAN FORESTRY* under the heading "Forest Economics: Some Thoughts On An Old Subject," by Wilson Compton, appears to suggest valuable ideas, and reminds us all of serious obstacles in the path of a real far-reaching and constructive forest policy.

The basic principle dwelt on by Mr. Compton, of land classification, seems to me to be one of the most important problems confronting our almost united efforts to realize a practical solution of the much talked forest policy.

We all know that certain regions are better adapted to forestry than are others. We also must admit that these other regions offer national potential possibilities over a long span of years far greater than would forestry. While the need is urgent for a policy beginning now, yet we must begin on a sound basis by a careful selection of our future forests in order that we may avoid an economic blunder of far-reaching consequences.

BOX MANUFACTURERS RESOLVE

THE National Association of Box Manufacturers at a meeting held in New York City on October 10 adopted the following resolution with respect to a National Forestry Program:

WHEREAS, Wood is a basic material not only for our own but also for other fundamental industries in this country and countless articles made from wood are a daily necessity in the life of the people and

WHEREAS, Our forest capital is being rapidly used up without a provision for future supply in any way adequate to certain future needs, and

WHEREAS, There is a sufficient area of land in the United States better adapted to the growing of timber than of any other crop to produce under proper management an annual yield of forest products in ample supply for the needs of our industries. Be it

Resolved; That the officers of the National Association of Box Manufacturers be authorized and directed to do all in their power through co-operation with the members of this organization and other similar organizations and public agencies to promote the adoption of a National forest program carried out by the State and National Governments which shall include as its cardinal features:

FIRST: A revision of the forest taxation laws so that the owner of land who wishes to hold it for successive timber crops may have such land separately classified with the payment of only a small annual tax upon the land itself and a final payment of stumpage tax at the time of cutting; the establishment of forest nurseries and the preparation of forest working plans by means of which public advice and assistance the land owners may be enabled to secure timber crops of the greatest quantity and value.

SECOND: There should be a very great and vigorous extension of Federal and State co-operation with forest owners in the prevention of forest fires. While it may not be expedient for the public to compel the owner of land to grow timber upon it in case he does not wish to do so the public has the unquestioned right to require the owner to handle his timber cutting operations so that they will not become a public menacc. In case the owner of land which upon competent examination has been classified as suitable only for the growing of timber refuses to take advantage of relief from taxation and public assistance in the growing of timber or public requirements as to the safe-guarding of the property of others, such land should be acquired by the public at a fair valuation and made part of the system of public forests.

THIRD: Provision should be made for a large extension of forest planting upon land already held by the State and National Governments for forestry purposes. The growing of timber is a long-time undertaking and no matter how soon nor how extensively large scale planting operations be started, there is grave danger that we cannot sufficiently bridge the gap between existing and future supplies of wood products.

FOURTH: Our present public forests, situated chiefly in the West, contain some 135,000,000 acres, but at least 50,000,000 acres of this total does not carry timber of merchantable value. Ample precedent for the enlargement of these forests by the purchase of cut-over land has been established during the past few years by the purchase of more than 1,000,000 acres of forest land in the Eastern mountain regions. Such public purchase of forest land both East and West should be continued by

the State and National Government until the area of publicly owned timberland is at least twice as great as at present.

* * * * *

Only by prompt and energetic measures to accomplish purposes in harmony with these principles can there be foreseen any possibility of alleviating a most serious timber shortage within the next generation.

A FOREST POLICY

BY FRANK L. MOORE, PRESIDENT NEWTON FALLS PAPER COMPANY

IN discussing a Forest Policy it should be approached from two viewpoints, each related to the other. The two should be considered as related if we will accomplish practical forestry. This is too large a subject and with too many ramifications to be dealt with briefly except in generalities.

Federal Policy.—I am firmly convinced there should emanate from our Federal Government a practical constructive program of forestry, one that will not only tend to make our forests reproductive, to conserve them, but at the same time utilize them in the best interests of recreation and practical forestry. By practical forestry I mean where the forests are managed as a business proposition. This program should be a guide for the States to follow so far as adapted to the national conditions of each. I am also convinced that the direct management of forest lands by the Federal Government should be confined only to those lands that are owned by the Federal Government.

This Federal program of forestry should be so plain and so imperative as to convey to the various States of the Union the necessity of each State immediately enacting such laws as will accomplish reforestation of State and privately owned lands, utilizing a matured tree crop, making the watersheds of our rivers and streams real watersheds, emphasizing at all times the necessity of having our forests so handled and operated as to improve them for the pleasure seeker and maintain restricted areas for wild game.

State Policy.—First of all is adequate fire protection. The necessity of this needs no argument. A definite survey should be made of our state-owned lands to determine exactly what we have. By this I mean the amount and species of timber, the nature of soil, the amount of burned-over land, cut-over land, land that is fit only for reforestation; in other words, a complete inventory. This information should be obtained from all owning 500 acres or more of timberlands.

Each of our agricultural counties through its Board of Supervisors should employ a forester to make an inventory or survey of the lands that are fit only for growing trees, giving its area, the owner, the nature of the soil, etc.

With this information in hand there should be some definite policy outlined for the management and operation of our state-owned lands that would permit of the cutting of the matured crop under the closest and most strict regulations, so as to maintain the forest in a reproductive condition, and also as a game preserve and enhance its beauty for a recreation park. The waste lands

should be reforested much faster than is being done at the present time.

There should be a definitely outlined policy of educating the people to a point where they should demand of our legislature appropriations to have the State lands reforested. The condition of the matured crop on our State lands should be so put before the people as to show them that this crop could be utilized at an immense profit to the State, and with absolutely safety to the forests, and in many cases improving the forests from the aesthetic point of view.

Privately Owned Lands.—I believe everyone who has invested money in any enterprise so long as it is not a nuisance, should be allowed to enjoy its use and the emoluments to be derived therefrom. The argument has been raised, and perhaps in some cases justly, that in the interests of public health all forest lands should be owned by the State and forever locked up for the benefit of the pleasure-seeker and wild game. On the other hand, is not he who cuts a forest, converts it into lumber, pulp, paper, or whatever use the product can be put to, serving the public?

The problem of suggesting a forest policy for the large timberland owner is much simpler and easier and its application less burdensome than doing the same for the small timberland owner. It is the small timberland owner that must be justly dealt with if we would have continuous forests along our rivers and streams and on our mountain slopes, so necessary to obtain a real forest.

The intermittent planting of today will not produce the deep forest cover necessary for the perpetuation of our forest and the regulation of our rivers. Many owners of timberlands will not reforest today on account of the long time involved for these tree crops to grow.

Reforestation must depend largely upon Governments and Governments will act only in this direction in the response to the pressure of intelligent people.

Having this in mind I am going to repeat here the suggestions which I have made many times, which have not been refuted, as a basis for a constructive forestry policy.

I believe a law could be so drawn as to be constitutional that would permit the State to reforest private lands under the following conditions:

1. An individual or Corporation to make application to the Conservation Department to reforest certain lands.
2. This growing crop to be exempt from taxation.
3. The trees when matured to be cut under State supervision and a stumpage paid to the State.
4. The stumpage to be a lien against the growing crop.

5. The amount of stumpage to be agreed upon by the owners and the Commission in charge. In case of disagreement the two to select a third and his decision to be final.

6. The trees to be considered matured when they have reached a diameter of 10 or 12 inches on the stump.

7. Careful surveys and records of all parcels planted shall be filed with the owners and the Commission.

8. If at any time the owner should wish to discharge the lien he can do so by paying the cost of reforestation plus the interest at a nominal rate and agreeing to practice modern methods in his operations.

If necessary in order to carry out the above the State can be mandatory in reforestation such lands as in its opinion should be reforested.

It involves the initial expenditure by the State with an absolute sure return to the State when these trees are matured and cut.

It makes possible a continuous forest which we know

must be grown in order to obtain the greatest possible results.

It makes possible the utilization of land unfit for anything but the growing of trees.

It protects the head waters of our streams so necessary for a more uniform flow of our rivers.

It makes the operation profitable to the State.

It insures a supply of timber necessary for the use and enjoyment of the people.

It prevents erosion.

It maintains a higher moisture level in our agricultural lands.

In view of our rapidly depleting wood supply, the anxiety that is felt in Canada over the fast depletion of her forests, should spur us on to greater efforts to educate the people of the country to the necessity of a practical forestry program.

What I have said above is in the nature of suggestions from which I hope something practical can be worked out and at once put into operation.

FOREST RESTORATION IN BELGIUM

BELGIUM is restoring its forested lands to a normal condition just as fast as intelligent planting and cultivation makes such restoration possible. There is no lack of labor for the work as the enemy so completely denuded the country of mechanical equipment that resumption of industrial activity is unavoidably delayed.

What is being done in reforestation in Belgium is well described by an English newspaper writer in the *Philadelphia Public Ledger* of October 21. He says:

"The purpose of the visit to Belgium was to inspect the forestry and general reclamation enterprises upon which the government and private land owners were engaged, when the war suspended operations, and which will be resumed at the earliest possible moment with unabated vigor and diligence. The tour was made under the guidance of Henri Vendelmans, who was responsible for many such projects in Belgium in pre-war times.

"In view of the prominent attention that has been given to afforestation in Great Britain and the increasing need for developments, it may be appropriate to give references, first, to work of this description already accomplished and in process of completion in the provinces visited. The program began with a tour of the historic forest of Soignes, near Brussels. Those interested in forestry will be familiar with the distinguishing features of this marvelous expanse of stately beeches, firs, oaks, ash and poplars, and it need only be said that the 10,000 acres of matured and maturing timber and underwood have survived the ordeal of war without serious damage. The enemy did not spare it when their requirements demanded contributions from its wealth of valuable war material.

"Ash was taken without stint for the construction of airplanes, and beechnuts would have been gathered for

the extraction of oil if the staff could have been induced to render such service to the invaders. The comparative immunity of the great forest is due largely to the wisdom and tact of M. Crahay, director of forestry, who, when requested by the Germans to provide them with timber agreed to double the annual normal output if they would consent to the control remaining with him. The advantage of this arrangement was, and is, that while the contribution of 18,000 cubic meters was twice the usual amount, promiscuous cutting was avoided and thus the forest retains its former commanding proportions, to all appearances, unimpaired.

"While the thousands of acres of pure beech constitutes the outstanding feature of the forest and will, in itself, ever be a center of attraction and an education in organized and efficient forestry, there are many other departments equally instructive and suggestive. The system upon which the great crown property is managed is comprehensive enough to allow of wide variety of trees and undergrowth, as well as experimentation in plants, methods of planting and after management.

"In these matters the Arboretum of Groenendael, under the direction of M. Querriere, is exceedingly instructive. The nursery and experimental sections have not fully recovered from the partial suspension caused by the war, but work is again in progress and the various plots are fruitful of useful suggestion and practical demonstration. An indication of the value and activity of the nurseries is furnished by the fact that in the forest of Hertogenwald, east of the Meuse, where great devastation was wrought by the Germans, 250 acres have already been planted with spruce four-year-old plants—from Soignes.

"Several important discoveries stand to the credit of the wartime researches. For instance, the fungoid pest,

which has stopped the planting of white pine, has been remedied effectively by the spraying of seedlings. In the present demand for the speedy recreation of forest nurseries the observation that sowing seed, gathered early, avoids waiting over a year for germination, is a valuable discovery. For this purpose ash seed pulled and sown on August 16 grew best—a full bed—the succeeding spring, but of October seed from the same tree none grew till the following season. Hawthorne berries sown on September 15 gave a good result, but delay was experienced when berries gathered in October were sown. The significance of these points will be appreciated by practical foresters.

"From Soignes, with its vast tracts of matured timber, nurseries and museums, the party moved to the Campine, on the Dutch border, making the old town of Turnhout, famous for its paper and playing card factories, its headquarters. The first day in this expansive sand belt was spent in inspecting young forests of some 1,500 acres belonging to the board of agriculture. The whole of the land was reclaimed from waste and the method adopted in effecting the transformation, and the result as already presented in the healthy and quick-growing alder firs and birches, provide an instructive example of what can be accomplished in converting apparently worthless sandy tracts, slightly undulating, with the scanty herbage of plants of our grouse moors and the home of ducks, curlew, snipe and blackcock, into useful tree-bearing areas. Preliminary cultivation and the growing of yellow lupines for adding humus to the soil, formed important features in the routine, and the conclusion is warranted from what has already been achieved at this and other centers, that the scope for successful afforestation is wide in all countries, and that it would be difficult to set limits to enterprises of the kind in the United Kingdom, if they were planned and carried out on sound lines.

"At the Raevels, reclamations, planting and preliminary operations have been in abeyance since 1914, and the director, M. Quermet, has been concentrating his attention upon the management of the areas already planted, some of which are carrying trees 10 and 12 years old. These plantations, and those of neighboring owners, provide interesting lessons in enlightened and systematic forestry.

"Trees are planted in considerable variety and the relative results carefully noted. A Japanese larch plantation at Esbeck visited the following day is especially worthy of mention. At fifteen years old it is already of high value. It was planted closely, the trees being only one meter apart, and since then the suppressed trees alone have been removed. At Raevels the planting of Sitka spruce has been attended with success, when precautions were taken to give it the shelter it requires in early life. Many species are being tested, and when the young woods afford sufficient humus other species, such as poplar, will be introduced. The woods are mostly Scotch pine, but, besides these, exotics are planted freely. There is no falling off in vigor as time goes on, as is instanced by a forty-year old pine plantation at Rethy, carrying 108 loads of pit wood per acre. The demand for firewood is so extensive that all expenses of early thinning are re-

couped from this market, and it was pointed out that when it is desired to reclaim for agriculture land from which wood has been felled the fuel value of the stumps covered the cost of removing them.

"The essential conditions of success appear to be preliminary cultivation, manuring with lupines and chemical manures, liming and surface draining. No farm crop could be more responsive to suitable treatment of this description than the young plantations occupying the former wastes of Campine have been. The work entails considerable initial expenditure, but by thick and mixed planting and the inclusion of undergrowth, such as alder, the period during which the areas are unproductive is curtailed and the financial problem appreciably simplified for the state or private owner.

"Other reclamation and afforestation enterprises in the same province visited were those of Baron van Haver, under the management of M. J. de Wilde, of the Utrecht Insurance Company, at Esbeck, where M. C. Sissingh is director and of the King of the Belgians, near Rethy, under the supervision of M. R. van Elst. At all these centers forestry constitutes only part of the general scheme of reclamation and it is less prominent relatively at Esbeck and on Baron van Haver's estate than at Raevels and on the royal property. At both places, however, the value of trees is appreciated as a direct source of wealth and a part of composite improvement, and the work is conducted on lines similar to those that have answered so successfully elsewhere.

"The king's estate of 10,000 acres is a noteworthy example of intelligent and balanced reclamation. The work was begun fifty years ago when the land was bought from the different communes for Leopold I, at whose death the property passed to the Count of Flanders and in due course to the present king, and steady progress, interrupted only during the war, has been made in developing the property to the benefit of the district and the country. "Already operations have been resumed upon the land that reverted to its former wild state in the past few years."

THE DOUGLAS FIR

By Donald A. Fraser

Proud monarch of the West's green-fringed hills!

Majestic pillar of the sunset sky!

In grim, dark grandeur thou dost raise on high

Thy tap'ring head to where the glory fills

The firmament. The roseate radiance thrills

My soul not more than that weird melody

The ocean breeze awakes mysteriously

Among thy boughs whenever it so wills.

Long centuries have scored thy rugged side

With gashes rude and deep; thy wounded heart

Hath shed great tears, and these, congealing,

hide,

Or strive to hide, the gaping rents in part;

And centuries more thou still might'st stand

in pride,

But envious man now claims thee for his mart.

EXTENSION WORK IN FORESTRY

BY A. F. HAWES, EXTENSION SPECIALIST IN FORESTRY

THE readers of AMERICAN FORESTRY are thoroughly conversant with the progress that has been made during the past twenty years in the administration of the national forests, and of state forests in a few states. It is a lamentable fact, however, that the private forests, comprising about four-fifths of the forest area of the country, have as yet been little affected by the application of forestry principles except in the matter of fire prevention. The remoteness of much of this forest area and the existing market conditions make the introduction of intensive measures impracticable at present. But these objections can hardly be raised in regard to the farm woodlands, which comprise about two-fifths of the total forest area. They are comparatively accessible to the markets and are less exposed to damage by fire than other forest property. Moreover, they can be handled more advantageously in connection with other farm operations and in such a way as materially to help the farm-labor problem and increase the farm-labor income. The handling of the farm woodlands, most of

which are of small area, does not call for involved working plans, but rather for the application of common sense based on a knowledge of forestry principles. In many cases co-operation on the part of woodland owners in the handling of their products will doubtless seem desirable in order to obtain the best results. Leadership is necessary in order to bring about better management of the farm woodlands just as it has been necessary in producing better farm management. This leadership can be provided very largely through the county agents and the other extension forces which are being developed under the Smith-Lever law. The extent to which this extension work is now being carried on and its possibilities for improved agriculture, including forestry, are hardly realized by the majority of people.

During the fiscal year 1917-1918 there were regular funds available for extension work amounting to \$7,625,000, of which about two-fifths came from the federal government; one-fourth from the various states; one-fifth from county appropriations, and the remainder from the colleges and miscellaneous sources. In addition to these regular funds, Congress made available for that year through the food production act \$4,348,400 for similar purposes.

All of the agricultural extension work is administered through the States Relations Service, which is a bureau of the Department of Agriculture, just as the Forest Service, Office of Farm Management, etc, are bureaus of the department. The work of the States Relations Service is handled in two offices: the office of the south having to do with the states of the cotton belt; and the office of the north and west dealing with 33 northern and western states. Of the funds described above, \$1,040,000 was appropriated by Congress to the States Relations Service and was available for administrative and demonstration purposes at the discretion of the service. The funds appropriated under the so-called Smith-Lever Act, amounting in 1917-18 to \$2,080,000, were divided by law among the various states in proportion to their agricultural population. Thus Pennsylvania received \$108,383.33, while Connecticut received \$13,725.86. These allotments to the various states are contingent upon the state appropriating an equal amount minus \$10,000. Thus Pennsylvania appropriated \$98,383.33 to receive its federal allotment and Connecticut \$3,725.86. This Smith-Lever appropriation is increased annually by \$500,000 up to 1922-23.

These monies, both state and federal, are administered by the various agricultural colleges through their



FIRE-SCARRED KENTUCKY BLACK OAK

Farm woodland of black oak which has been injured by fires and insects. It should be reproduced to more valuable species and protected.

stration purposes at the discretion of the service. The funds appropriated under the so-called Smith-Lever Act, amounting in 1917-18 to \$2,080,000, were divided by law among the various states in proportion to their agricultural population. Thus Pennsylvania received \$108,383.33, while Connecticut received \$13,725.86. These allotments to the various states are contingent upon the state appropriating an equal amount minus \$10,000. Thus Pennsylvania appropriated \$98,383.33 to receive its federal allotment and Connecticut \$3,725.86. This Smith-Lever appropriation is increased annually by \$500,000 up to 1922-23.

These monies, both state and federal, are administered by the various agricultural colleges through their

extension services. There is usually a director of extension in charge of this work corresponding to the dean in charge of the teaching on the campus and the director of the experiment station in charge of investi-

sion service a growing body of specialists responsible for extending the knowledge of the various branches of agriculture throughout the state and corresponding to the professors who teach in the institution. Thus we have specialists on animal industry, dairying, horticulture, agronomy, entomology, rural engineering, and in a few cases in forestry, according to the needs of the state as judged by the extension director.

The question naturally arises as to whether the extension directors are awake to the importance of farm forestry as a branch of agriculture and whether the time is not ripe for the expenditure of part of this money for extension in forestry as its importance would seem to indicate. Statistics recently compiled by the Bureau of Crop Estimates show that for the year 1918 cordwood was the sixth most important crop of our farms, being exceeded in value only by corn, wheat, oats,



A SPLENDID STAND OF SPRUCE

This land was formerly pastured and timber raising is therefore more profitable here than grazing.

gational work. The money is largely distributed among various extension projects according to his knowledge of the needs of the states, but under the supervision of the States Relations Service at Washington.

A few fundamental lines of extension work have been developed which rightly utilize most of the money. Of these the employment of county agents is most important. About half of all the money available is utilized in maintaining this force of agricultural experts who are in a position to bring any methods of improved agriculture, including forestry, directly to the attention of the farmers. The work for farm women very appropriately comes next, utilizing 15 per cent of the funds. Under this project a great many counties have home-demonstration agents. Boys' and girls' club work holds a well-deserved position next to the women's work, having 7 per cent of the funds.

In addition to these three fundamental agencies by which all lines of agriculture may be brought directly to the men, women, and children, there is in each exten-

hay and cotton. The total farm value of this crop was \$487,106,000. While it is true that there is no relation between the amount grown in a year and the amount cut



AN UNFORTUNATE MIXTURE

Here valuable white pine is being injured by inferior gray birch. The latter should be removed to help the pine.

it is also worthy of note that there are other valuable products of the farm woodlands such as posts, ties, poles, lumber, etc.

In the eastern United States there was a woodland area on farms in 1910 of 143,391,568 acres,* a decrease of about 15 per cent since 1880. The ten states having the largest areas, each with over six million acres of woodlands on farms are Georgia, North Carolina, Alabama, Missouri, Virginia, Tennessee, Arkansas, Mississippi, South Carolina and Kentucky. These southern states are, of course, prominent in this grouping largely because of their size. The ten states in which the largest proportion of the farm land is wooded, in each case over 40 per cent, are as follows: North Carolina, Florida, Georgia, Arkansas, South Carolina, Alabama, Maine, New Hampshire, Virginia, and Rhode Island. If the states are grouped in relation to the value of the cordwood produced on the farms in 1918, the ten leading states, each producing over 18 million dollars worth of wood, are: Michigan, Texas, New York, Georgia, North Carolina, Wisconsin, Virginia, Arkansas, Mississippi, and California. Grouping them in relation of the woodland income to the total farm income the ten states in which the woodland income exceeds 8 per cent of the farm income are as follows: New Hampshire, Maine, Vermont, Florida, West Virginia, Massachusetts, Connecticut, North Carolina, Rhode Island, and Virginia. It will be noted that North Carolina and Virginia appear in each of these four groups and may, therefore, be considered the most important farm woodland states.

The extent to which a state can help the woodland owners through the Smith-Lever law depends partly upon

* Bulletin 481. "Status and Value of Farm Woodlots in eastern United States," by E. H. Frothingham

the size of the agricultural population of the state and partly upon the importance of the woodland problems as compared with the other problems of the farms. The ten states receiving the largest allotments under the Smith-Lever law, in each case over \$100,000, for the year 1919-20 are: Pennsylvania, Texas, Illinois, Ohio, Georgia, New York, Missouri, North Carolina, Alabama and Tennessee. It is, of course, apparent that in some states, as in those of New England, where the woodland problems are relatively important, comparatively small funds are available from this appropriation either because of the small population, as in Vermont, or the relatively large urban population, as in Massachusetts. The New England States were, however, the first to realize the importance of the woodlands and they have accordingly built up strong forestry departments. In fact, the state foresters were carrying on extension work before the agricultural extension work in New England existed. It will, therefore, be the best policy in these states for the extension services to assist the state foresters in so far as their limited funds permit. In states, where there is no strong forestry department, or where the state forester is wholly occupied with fire prevention or the administration of state forests, a specialist in forestry should be employed by the extension service, and an organized effort should be made to bring improved woodland management directly to the attention of the farmers.

In order to direct the work in farm forestry extension, the Forest Service will need financial support from Congress similar to the support which other bureaus receive for their extension work.

OUR OFFICES BURNED OUT

On October 6th, a fire in the Maryland Building, Washington, D. C., burned out the offices of the American Forestry Association. The employes all escaped safely but the fire destroyed large numbers of magazines, a quantity of stationery, and a number of records. Luckily membership records were preserved, and aside from a two weeks' delay in issuing the November magazine the members are not inconvenienced.

Ample insurance policies covered the actual losses in stationery, furniture, typewriters, etc., and two weeks after the fire the Equitable Fire and Marine Insurance Company, of Providence, Rhode Island, made a satisfactory settlement.

The lost magazines, however, cannot be replaced by insurance and the members are requested to kindly assist in restoring the magazine files of the Association by contributing back copies if possible. The following issues are particularly desired:

1919—January, February, March, April, May and July.

1918—March, April, June, July, August, October and December.

1917—January, February, March, April, May, June, August, October, November and December.

1916—January, March, October and December.

1915—January, February, March, April, May, June, July, August and September.

All months of all previous years.

Please mail magazines to American Forestry Association, Maryland Building, Washington, D. C.



CUTTING LARGE TIMBER

This is a typical felling operation in a heavy stand of hemlock in the British Columbia coast region.

TIMBER CRUISING

BY P. L. LYFORD

MOST lumbermen, or persons interested in timber, understand that a "timber cruiser" is one who estimates the quantity and quality of logs or lumber contained in standing trees. He is also expected to advise as to topography, logging conditions, and anything else his employer may require to know, which has a bearing on the ability of the tract under consideration to produce logs profitably.

No doubt the earliest logger was somewhat of a timber cruiser, but he would not have known himself by that name. It was at a much later day, when the timber "looker" went out on long trips with a map for a chart and a compass as the most indispensable part of his equipment for roaming the trackless forest that someone likened him to a mariner who, similarly, finds his way on the pathless sea, that the term "cruiser" was applied to him. It was an apt comparison, and the term "stuck."

The quantity of standing timber is usually expressed in board feet, according to the log rule used in the locality concerned. There are some exceptions to this, notably the pulpwood regions of the Eastern United States and Canada, where the cord is largely used as a unit of measurement. The cord is also used on the Pacific Coast for measuring Cedar Bolts for shingles. Theoretically the log rule gives the number of board feet that the logs will produce in the form of sawn lumber. In practice, this is rarely the case, because of imperfections in log rules, errors in allowance for defects, or curved, crooked, or broken logs. However, the cruiser must report in board feet, and it is obvious that his results will always be somewhat less than exact.

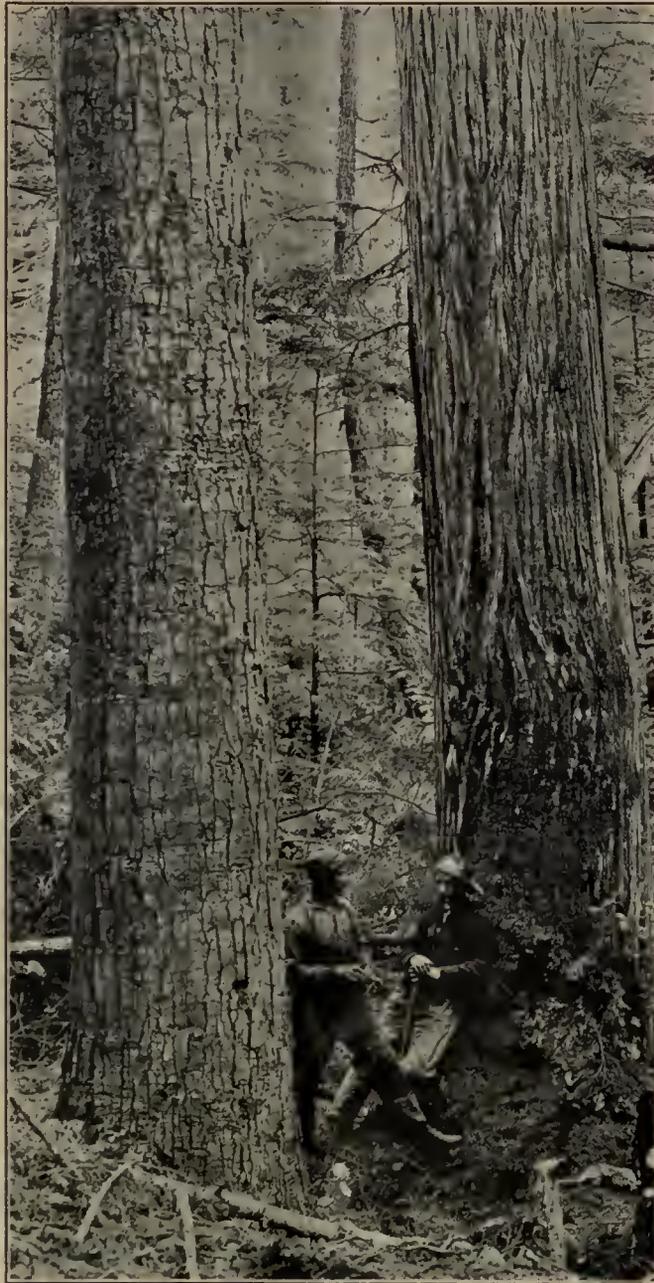
In the early days (and even now, to some extent), the

timber cruiser frequently estimated comparatively small areas by eye, simply wandering through the tract more or less systematically, and making up his mind by comparison with similar tracts with which he was already familiar that this one would

run so many thousand feet to the acre, and multiplying this by the number of acres in the tract to get the total stand of timber. Usually, however, in recent years, practically all cruisers make an estimate of the individual trees on a certain proportion of the area, to furnish averages for applying to the whole area.

The detail of procedure for most cruisers in determining the scale of a tree is somewhat as follows: Estimate the thickness of the bark, and determine the diameter of the butt of the first log *inside* the bark. (This is not so easy to do on the Pacific Coast where the bark varies from one-half inch on small spruce trees to as much as a foot in some cases on large Douglas fir trees.) Calipers or diameter tape may be used to measure diameter *outside* the bark. Next, the taper of the tree is estimated so that the diameter inside the bark at the end of the first log may be determined. (To get the number of board feet in a log, it is necessary to know the length of the log and the diameter inside the bark at the small end.) This is repeated for each log until the top of the merchantable length is

reached. A few inches extra must be allowed for the length of each log in order to provide for full even lengths of lumber when the log is sawed. Now the measurement for each log having been determined, it remains only to read the scale in feet for each log from the log rule table and add the logs together to get the



PACIFIC COAST BALSAM FIR ON THE LEFT AND YELLOW CEDAR OR CYPRESS ON THE RIGHT

scale of logs in the whole tree. The tree has, in the meantime, been scanned for signs of defect, or outward indications calling for a reduction in the scale. When such a suitable deduction has been made, the final result should be close to the actual lumber content of the tree. This, however, is a slow process, and not many cruisers take time to do the work so thoroughly. After the eye has become trained to sizes and lengths, a somewhat prolonged glance at a tree enables the cruiser to make up his mind as to the scale of the logs, and the amount for the tree is put down in round numbers. Many cruisers also note the percentage of grades, either of logs or lumber.

Trees are tallied in this way, over certain areas, either in the form of strips or sample plots. The trees are tallied on a *strip* by following a straight compass line, and including all the trees for 33 feet (one-half chain) on both sides of the line, so that a one-chain wide sample of the stand is obtained, and when this has been done for a distance of ten chains, the trees on *one acre* have been tallied as to board feet contents. The average stand for a number of acres is obtained in this way, and when a certain proportion of a "forty" or a quarter-section, or a square-mile section has been covered, the average is applied to the whole area. When the sample plot method is adopted, the sample plots are generally taken in one-half acre circles, and located at regular intervals on the cruise lines. The strip method is more satisfactory, however, and is much more widely used.

The results of the work of the timber cruiser range from simple columns of figures giving the kinds and quantities of timber, to a fairly elaborate map with elevations marked, and cruise figures recorded directly on the map, accompanied by a written report. Methods of field work and form of presenting results vary widely according to the personal experience, character, and ability of the individual cruiser.

The demands of timber owners, lumbermen and log-

gers have led many cruisers into the habit of working on rather a wide margin. Often a man who has timber to sell, is, of course, eager to see as high a cruise as possible on his timber land. On the other hand, a lumberman who wants a report on timber which he intends to buy and operate, demands a considerable margin of safety and consequently thinks most highly of the cruiser who turns in a figure well below what he will cut off the tract when

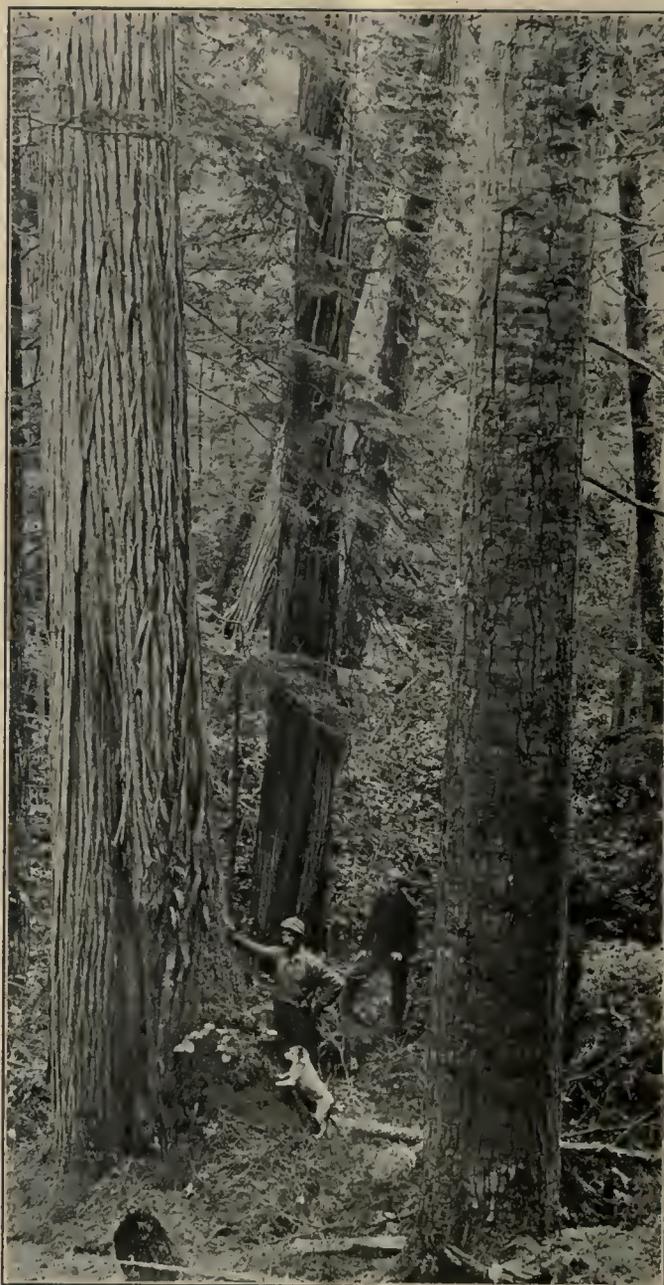
he operates. This has resulted in an uncertainty among timbermen and investors as to the validity of cruise reports in general, because of extreme variations in reports on the same tract, due to variability in standards and methods.

What the cruising profession has lacked is engineering training, with its resulting standardization of methods. The forest engineer, who is the modern timber cruiser, has brought his technical training to bear on the problem, and expanded the "timber cruise" into a "forest survey." The chief points of difference between the two are that the forest survey includes topographic (contour) maps, based on a series of systematically located compass lines, and a more extensive use of *measurements* as a basis for determining volume in board feet.

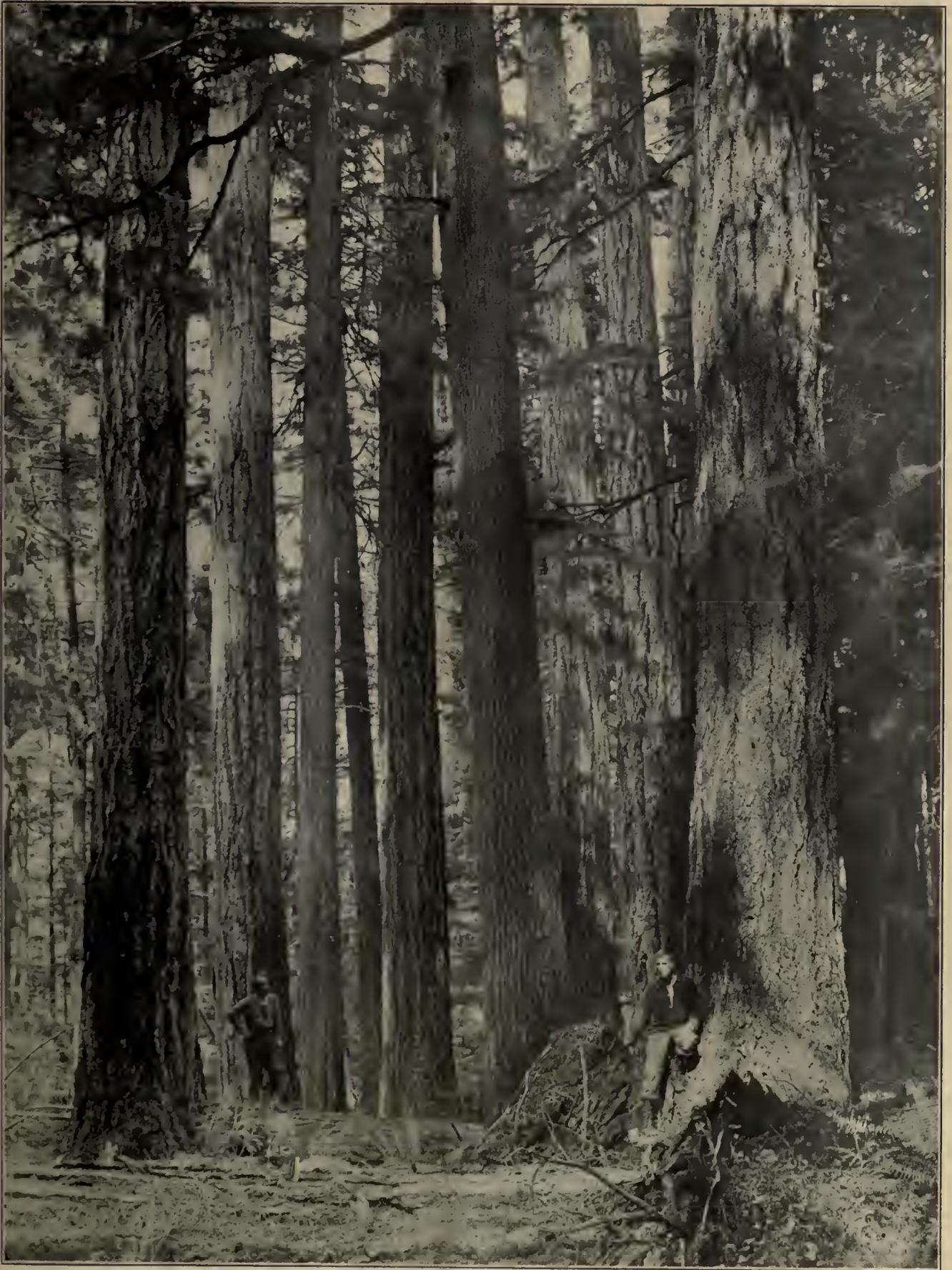
The first necessitates the establishment of base lines, carefully chained and leveled, and marked at five or ten-chain intervals for cruise lines. (See sketch plan.) The cruise lines are run from one base line to the other at whatever intervals have been decided on, usually ten chains apart. For smaller areas and

patchy timber, a closer spacing is obviously desirable. Likewise for large areas with extensive uniform timber types, wider spacing may be used. Complete record is taken of all stream crossings, rock outcrops, elevations, etc., and the timber is tallied for 33 feet (one-half chain) on each side of the line.

If the spacing of cruise lines is 10 chains apart, the parallel cruise lines (on which a complete tally of timber and other data are taken) will, of course, occupy 10 per



"CYPRESS" OR YELLOW CEDAR ON LEFT AND PACIFIC COAST BALSAM FIR ON THE RIGHT



TIMBER IN THE BRITISH COLUMBIA COAST REGION

The trees from left to right are two five-foot Douglas firs, a three-foot cedar, a five-foot fir, a three-foot hemlock, a six-foot fir and two five-foot firs.



WESTERN RED CEDAR

cent of the tract. Where the spacing is 5 chains, 20 per cent of the tract is covered. For any but very small areas, a 20 per cent cruise is sufficiently accurate even for high priced stumpage.

The second brings in the use of "Volume Tables." A volume table for any kind of timber, Douglas fir, for example, is a table that gives the average scale for Douglas fir trees according to diameter breast-high (*i. e.* 4½ feet above ground) outside the bark, and merchantable length. Thus, from a volume table prepared by the United States Forest Service, one can read that a fir 36 inches in diameter, and having a log length of 170 feet, contains on the average, 2,020 feet if scaled with the Scribner Rule. The volume table is made up from a large number of measurements of trees of all sizes, taking the diameter breast-high outside the bark (which can always be actually measured, and, therefore, does not need to be estimated) and the scale of the whole tree by logs according to the log rule. Of course, these measurements are taken from felled trees, and the scale of the trees 36 inches in diameter breast-high, for instance, is averaged, so that one volume figure is obtained that will apply to all trees of that species 36 inches in diameter and within a certain range of merchantable height.

In using a volume table it will be borne in mind that its figures are average figures, and that local measurements must always be taken on each tract so as to determine whether the timber on the particular area cruised will scale better or poorer than the average shown by the table, and how much better or poorer.

From 80 to 95 per cent of all sound trees of any species within any type of stand fall within a normal range of variation as to form of bole, and the relationship between base diameter and average volume can readily be determined by taper measurements on a comparatively small number of trees within each type in conjunction with volume tables based on taper measurements of large numbers of trees. The base diameters of these sound

normal trees are tallied as *measurements*, giving an *im-personal* volume control of the sound timber. Allowances for abnormal form and visible defect are tallied by trees as *opinions*. Allowances for unseen defect, breakage in falling, and other shortages, are made by types, or other subdivisions, rather than by trees.

The form in which the results of a cruise, or forest survey are presented, is an important consideration. A topographic map, with contours, and timber types distinctly outlined is most essential. This furnishes a bird's-eye-view of all conditions of interest to an owner, operator or prospective purchaser. The cruise figures may be put directly on the map, or tabulated separately by units of area. A separate cruise sheet or sheets furnish a compact summary of kinds, quantities, and sizes of timber. A written report covers all points not graphically shown

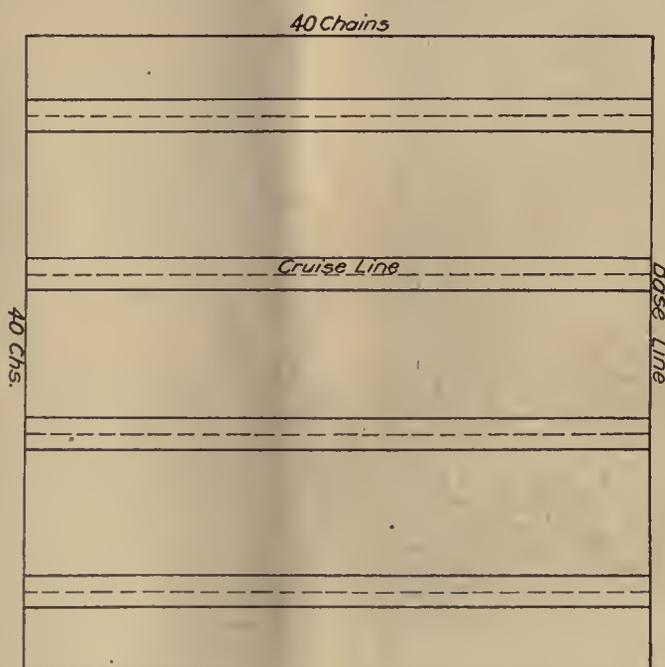
on the maps and cruise sheets, including a discussion of logging conditions, markets, etc. The whole is calculated to give the following results:

1. A reliable basis for valuation.
2. A basis for an effective plan of operation.
3. The best possible location of roads, camps and other improvements.
4. A reduction in loss from windfalls and normal decay. The felling areas can be adjusted with reference to the need of promptly cutting damaged or over-mature timber.
5. The preservation of knowledge relating to the property. Without a survey system, much information may depart with those who happen to possess it.

6. Reduction in loss incident to change of management in an operating company. An adequate forest survey provides a new manager with a mass of essential knowledge ready for his use.

7. Efficiency of fire protection system.

The cost is not the least important point in connection with forest surveys and cruising, though it has been left until the last. The charge for a complete showing as outlined above, rarely exceeds two cents per thousand feet, and usually is nearer one cent.



PLAN SHOWING ARRANGEMENT OF CRUISE LINES ON QUARTER SECTION (160 ACRES)

The dash lines represent the cruiser's line of travel. The light solid lines on either side of the dash lines are boundaries of the strip within which all trees are tallied. The topographic features between cruise lines are mapped as far as can be seen on the line of travel, thus filling in from line to line.

A CHRISTMAS SUGGESTION

Are you puzzled about the selection of Christmas gifts?

Why not give a year's subscribing membership in the American Forestry Association as a gift. It will cost you \$3.00, and the member will receive American Forestry Magazine for a year.

This will be an ideal Christmas gift for a child or an adult.

Send the money to the Association and a Christmas Card will be sent you to present on Christmas Day.

SENTINELS OF THE FOREST

CONTRIBUTED BY THE AMERICAN RED CROSS

THE branches of the trees bordering the Route Nationale interlaced overhead forming a long vista of restful green. Beyond, on the brown hills and the green, scattered among the fields of yellow mustard and waving grain, the fruit trees hung low in profusion



THIS WAS FRANCE IN PEACE

of pink and white blossom. Under foot the daisies rioted and forget-me-nots and clover brushed each other. The cattle browsed on the hills and the little stone houses stood neat among their kitchen gardens. It was France at peace. A sharp turn in the road and the scene changed. Gaunt, broken, burnt stalks of trees stood ghastly sentinel along the Route, stumps of fruit trees dotted the fields, seared and shell-torn, across the road an old peasant woman, bent with age gathered fagots to warm the cellar where she lived, beneath the wreck of her home. It was France at war. German devastation had sacrificed sixty-two per cent of her fire-wood and ten per cent of her lumber, to say nothing of her orchards.

Notwithstanding the heavy demands that came to it from every side, the American Red Cross, realizing the supreme value of "just trees" donated \$10,000 in support of the scheme of the Touring Club of France for replanting the woodlands and orchards of northern France. Early in 1919, ten thousand live trees were shipped from America to the devastated regions.

In America, the Red Cross is not concerning itself with the conservation of trees. It is satisfied that the

government has a well-organized scheme already working, backed up by such large, national organizations as the American Forestry Association, and strong forestry departments in the various States; but it has its eye on the man who looks after the trees, the forest fire guard. That sturdy pioneer, who puts himself beyond what is called civilization to stand sentinel for civilization, the man whose lonely vigil stands between a city and a flood of flame—is anything too much to do for a watcher who warns of such a disaster as the forest fires which swept the Superior Lake district last year?—and fights it, often at the risk of life. The Red Cross spent thousands of dollars to succor the victims of that catastrophe and it will work with the men who prevent disasters that we never hear about. It will continue relief in the out-of-the-way places that it has discovered in the course of its Home Service work with the families of the military men. It has taken comfort, cheer, health and even life to the tiny cottages in deep canons, and to the beacon towers on the mountain tops. It has established itself in districts, ninety per cent of which are not covered by any other relief organization. It likes these big,

free places and it likes the people, and wants to grow up with them, as their families grow, and become a composite part of the home. To continue its work for humanity, the Red Cross must have the united support of the American people. With this end in view, it is holding the third annual Christmas Roll Call. It is hoped and expected that last year's wonderful record of those who affixed their signatures to the Red Cross roster will be broken.



AND THIS IS FRANCE IN WAR



SYSTEMATIC DESTRUCTION BY GERMANY OF THE FRUIT ORCHARDS OF FRANCE

WHAT NEWSPAPERS SAY AS TO A NATIONAL

WITH October 27, the anniversary of the birth of Theodore Roosevelt, new impetus was given a national forest policy for the editors of the country have been quick to respond to the suggestion of the American Forestry Association that the greatest memorial that the nation can erect to the late president would be a national forest policy. The *Atlanta Journal*, in a leading editorial, says "the importance of a national forest policy was illuminated in an address by Charles Lathrop Pack, president of the American Forestry Association. His speech has attracted wide attention and it is to be hoped this sound advice will receive from Congress the attention it deserves. We believe the increasing interest in this question will make it the easier to impress upon Congress the importance of the enactment of desirable legislation." The *Philadelphia Inquirer* is among the first to take up the suggestion of honoring Col. Roosevelt with legislation looking to perpetuate our forests. To quote the *Inquirer*:

"The birthday anniversary of Theodore Roosevelt will be the occasion of many ceremonies in memory of this virile and robust American, but a suggestion has been made by Charles Lathrop Pack, president of the American Forestry Association, which is peculiarly appropriate. He says that if the people of the United States want to erect a real monument, a lasting memorial for all time, in honor of Theodore Roosevelt, they can do it on his birthday by starting to work for a national forest policy. He calls upon all who are in a position to do so to plant a tree in honor of this great American.

"It goes without saying that the other memorials which have been planned will be carried to completion. The success of the movement for the purpose is already assured, but it would be peculiarly appropriate if his name could be made the rallying cry for the preservation and the perpetuation of the forests."

The *Times*, of Trenton, N. J., is another paper to take up quickly the message which it does in these words: "It is a timely and important plea which Mr. Pack, of the American Forestry Association, makes to the people of this country in connection with the movement to honor the memory of Theodore Roosevelt. Mr. Roosevelt was a lover of all that pertained

to the great out-doors and trees surely have a large part in the kingdom of nature. This being true there can be no more suitable tribute paid to the former President's memory than the planting of trees and the preservation of forests. Forests are among the greatest national resources. Forests are like banks, as Mr. Pack tells the foresters, lumbermen and wood users generally, you must deposit in them if you want to take anything out. Then, in addition to the material benefits to be derived from the restoration and conservation of forests, the planting of memorial

lic sentiment must be aroused in favor of a more adequate and definite policy by the government in regard to forests." The *Geneva, N. Y. Times* impresses the point that "the American Forestry Association heartily supports the demand of the United States Forest Service for a national forest policy," and then points out the need for arousing public sentiment to that end. "Peculiarly fitting would be such a testimonial" says the *Boise Statesman* in an editorial on a memorial for Col. Roosevelt and it adds "in addition is the inculcation of the idea

which should be kept alive in America, the need of reforestation." The *News Press*, of St. Joseph, Mo., calls attention to the fact that "we have prided ourselves on being a business-like nation. Such extravagance as we have shown and continually show with our resources makes us seem to lack the first rudiments of far-visions business sense." Comparison between this country and the countries of Europe is taken up by *The Republican*, of Findlay, Ohio, which says "the same sort of a situation as faces this country faced the nations of Europe. They recognized it in time and now, governed by stringent forestry laws, have solved the problem." In an editorial reviewing the situation in Missouri *The Globe-Democrat*, of St. Louis, says "we face a serious forest problem resulting from the waste of ax and fire. We need in this country a greater realization of the value of our forests, of the need of their preservation."

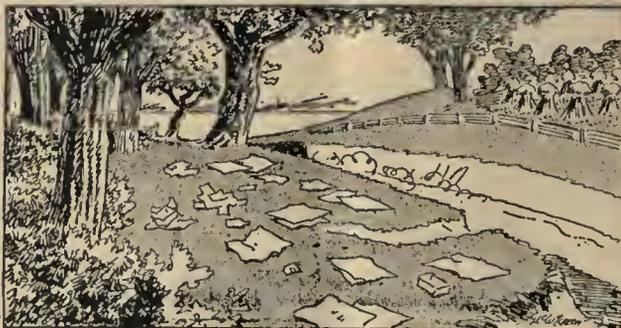
The *Commercial-Appeal*, of Memphis enlists in the cause of a forest policy and points out "that it is difficult to get away from the old idea that forests are objects to be exploited. We should stop the reckless clearing off of new grounds and reclaim the waste lands that already afflict the state." In the view of the *Boston American* "we can only preserve our forests by taking public possession of them and applying the principles of forestation that the Germans have worked out." The *Sun*, of Springfield, Ohio, says "the only possible remedy is preservation of great American forests. The American Forestry Association, realizing the acuteness of the situation, asks co-operation, from lumbermen so as to bring forcibly to the attention of state legislatures and the national congress the dire necessity for legislation

THE BEAUTIFUL PICNIC PLACE

(Copyright, 1919, by John T. McDerchosa.)



AS THEY FOUND IT.



AS THEY LEFT IT.

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trees is one of the greatest forces for Americanization and keeping aflame the community spirit, born of the war, according to the Association's officers at Washington, who are registering all memorial trees in a national honor roll."

Importance of a national forest policy is viewed by the editor of the *Christian Science Monitor* this way: "What is to be done? Obviously the nation must determine upon a comprehensive and efficacious forest policy, and it must do it without delay. Every state should be behind that policy, and national and state governments should go further than they have ever gone to bring the matter to the active attention of business and industrial communities everywhere." In the opinion of the editor of the *Houston Post* "pub-

FOREST POLICY AND A ROOSEVELT MEMORIAL

that will at least in a measure remedy the situation." The *Twin City Sentinel*, of Winston-Salem, N. C., says the "matter is one of immediate importance. It cannot be deferred indefinitely. Something should be done and now." It then quotes in full the article from *The Manufacturers' Record*, of Baltimore, which is based upon the statements of the American Forestry Association. "No mathematical genius is required to see the finish," says *The Advertiser*, of Elmira, N. Y. "Forest products are indispensable in almost every industry and trees are needed for a long list of necessities, from print paper to wagons, from lead pencils to aeroplanes. High cost of lumber means high cost of all these commodities." *The Plain Dealer*, of Cleveland, touches upon the call of war for wood and says "on a far vaster scale America raked her forests for war material. She cut millions of her Douglas spruce of the northwest, and throughout the country she selected the walnuts for special use in aviation. There is as yet no satisfactory indication that the nation is prepared to remedy the damage of war."

In *The Record*, of Philadelphia, we find that the editor believes "the war ought to do something to promote forestry in this country." He calls attention to the fact that two million men who saw the beautiful tree-lined roads of France are now back in this country. "We have got to make systematic efforts to replace the spruce forests on which we must depend for print paper," *The Record* concludes.

As a fitting memorial for these men who have returned and for those who did not return the planting of memorial trees continues to be a very popular subject of editorial comment. "Each year of added growth" says *The Telegram*, of Youngstown, Ohio, "should serve to bring out even more prominently the sacrifice made by the American boys, instead of allowing that memory to die." In the opinion of the editor of *The Leader-News*, of Cleveland, "it will contribute to the beauty, charm and welfare of the country and the happiness of the living, now and in the years to come, while it rears beautiful monuments to the dead." Memorial Tree planting along state highways is urged by *The Journal*, of Pierre, S. D., whom it strikes "as a mighty good scheme for this state." The sentiment is well said in *The Times*, of Flushing, N. Y., whose editor points out that "trees continue to grow and flourish years after the hand that set them out has dropped its working tools." In *The Observer*, of Charlotte, we find that "the planting of fruit-bearing trees along the public highways is an old hobby of

The Observer" which calls attention to the forward step the legislature of Michigan has taken in regard to bordering its highways with nut and fruit trees. *The Vindicator*, of Youngstown, takes up the action of the Michigan law makers and asserts that Ohio is the best state in the Union to do that very thing. *The Dispatch*, of Columbus, Ohio, has an editorial on the

FOREST MEMORIAL FOR ROOSEVELT

(*The Houston Post*)

As one of the original advocates of the conservation of natural resources, and a zealous worker for the preservation of the forests of the country in particular, the late Theodore Roosevelt is entitled to a large share of the credit for present day sentiment against waste and reckless exploitation of these resources.

Remembering the former president's conspicuous leadership in this movement, the suggestion of Charles Lathrop Pack, president of the American Forestry Association, that the American people observe Mr. Roosevelt's birthday by starting to work in earnest for an adequate national forest policy is most appropriate, and will doubtless meet with general approval among the people.

It has also been suggested that part of the Roosevelt Memorial fund be expended in setting aside a national forest in his honor, a form of memorial that is particularly fitting to the great student and lover of nature, and which would undoubtedly have met with his hearty indorsement, had he been consulted on the matter during his life time. If the American people desire to erect a memorial to him, it would be difficult to select anything more appropriate.

The American Forestry Association is appealing not only for preservation, but conservation, the latter including the renewal of the forests. The Roosevelt memorial is but an enlargement of this idea. If it is carried out, it will be not only a fitting tribute to a great American, whose love of trees and forests was a passion with him, but it will result in great material benefits to the people of the country. Such a memorial is both idealistic and practical—a combination of characteristics which was the source of much of the power for leadership in Theodore Roosevelt himself.

work of memorial tree planting by the American Forestry Association which has been widely quoted throughout the country. In the opinion of the editor of *The Messenger*, of Owensboro, Ky., "systematic nut tree planting and replanting along the roadsides of this country might not be so 'nutty' as it sounds." *The Telegraph*, of Harrisburg, calls attention to what can be done in memorial tree planting if the or-

ganizations having the welfare of a community at heart will co-operate with the American Forestry Association. "The setting out of Memorial Trees is a fine thing" says *The Talk*, of Alexandria, La., in pointing out the possibilities for classes in schools and colleges to plant trees either when they enter or leave the institution. *The Christian Herald*, of New York City, points to what New Bedford, Mass., has done and calls trees a community asset. "It is a splendid idea" says *The Beacon*, of Ashtabula, O., and should be entered into with enthusiasm and interest by the people of this country."

The Courier, of Lafayette, Ind., urges the people of that city to take up memorial tree planting at once. Memorial Tree planting, in the opinion of the editor of *The News-Times*, of South Bend, is the way for the private individual to do something for posterity. The trees will make the city famous in years to come in the opinion of the editor of *The Republican*, of Shelbyville, Ind., expressed in urging memorial tree planting. *The Democrat*, of Goshen, Ind., enlists in the plea for nut and fruit bearing trees. *The Evening Mail*, of New York City, has an editorial on the planting of fruit trees in Bryant Park and quotes Mr. Pack on the possibilities of utilizing the back yard and vacant lot for providing "fruit f. o. b. the kitchen door." The memorial tree planting movement is a wise one in the opinion of the editor of the *News and Courier*, of Charleston, South Carolina, which calls on the South in particular to take up the plan. "The American Forestry Association," says the *News and Courier*, "is wisely taking advantage of the keen and widespread interest in good roads to promote the cause which it has especially at heart—the cause of reforestation. The Forestry Association's efforts should be pushed and in the South especially it should be given the encouragement which it merits." In *Motor Life* we find the leading article with fine pictures devoted to "Plant A Tree for Remembrance" which tells of the Association's work. The editor also devotes an editorial to the subject. "Let's not stop; let's build the 'Roads of Remembrance' and see that they are lined with magnificent trees" writes the editor of *Motor Life*, who adds that "it strikes a responsive chord in our hearts." Every member of the American Forestry Association should rally to the cause of forestry and write his editor, in the name of the American Forestry Association, thanking him when space is given to forestry, memorial tree planting or like subjects. Then too each member should take the lead in tree planting in his community and report all activities to the Association.

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

THOSE interested in industries which use trees as their raw material in Canada are taking active steps to conserve and better utilize the existing supplies. On the 14th of October there will meet in Quebec a joint Committee of the Woodlands Section of the Canadian Pulp and Paper Association and the Quebec Limit Holders' Association to discuss recommendations to the Quebec Government for a change in the cutting regulations and legislation leading to compulsory reforestation. All the important lumbering and pulp and paper industries in Quebec, Ontario and the Maritime Provinces will be represented. The discussion will occupy a day and on the morning of the fifteenth a committee of the conference will have an interview with the Minister of Lands and Forests, Hon. Mr. Mercier, to present their views and make recommendations. It is hoped that by mutual discussion and co-operation the government and the wood using industries may work together for the protection, proper utilization and perpetuation of the forests. This getting together of wood-users, foresters and the government should have the best of results.

The report of the results of the expedition headed by Captain Daniel Owen, which explored Labrador timberlands by aeroplane, is very interesting and it is hoped that more details than were embodied in the newspaper dispatches may soon be forthcoming. There is no question whatever that such an expedition could have done nothing in the time taken without aerial transport, but we are anxious to know what landing places were used for aeroplanes, and, if the number of photographs, said by the press reports to have been taken, 300,000, is correct. It has been the experience of those who have visited Labrador that the timber was small and was confined entirely to the river valleys, the hills being either bare or covered with stunted spruce. Volume tables worked up for Labrador spruce show the timber somewhat shorter and smaller, on the average, than that of the territory west of Quebec.

That aerial transportation is ideal for reconnaissance and even for more detailed estimation of forest lands is beyond a shadow of doubt. The writer has made a reconnaissance of over 1,500 square miles from the air and each flight over a country develops one's ability to see more detail and estimate more closely. Sitting in a plane with a map one can mark the areas burnt, those in different types of timber, those which are restocking, etc. The height of the stands can be estimated and a rough

approximation of the proportion of softwood to hardwood in the crown cover. At three thousand to four thousand feet, jobbers' camps and dams can be seen and marked on the map, the drainage of a country and the contour studied and the way in which logs can be taken out of a certain district. A woodlands manager could easily, in a few flights, lay out his winter's operations without difficulty and to far better advantage than in the office.

Where, as in Quebec and Ontario, logging is carried out at long distances from civilization, often from one to two hundred miles, and where rail transportation seldom takes one nearer than 30 or 40 miles, planes would be invaluable for travel to and from the operations, especially for the higher executives who now seldom see anything of woods operations. With a plane a tour of all the operations could be made in two or three days. In case of serious accidents in the woods, injured men could be brought out quickly and as comfortably as if in bed.

The detection and reporting of forest fires is very easy, and during the past season a Johnson gasoline fire pump and 1,500 feet of hose was always ready to be transported to the scene of a fire. In the St. Maurice Valley there is almost always a lake within two to three miles of a fire, on which a landing could be made. As our experience shows that fires nearly always occur on lakes or rivers, the only routes of travel, the planes could almost always reach them. With settlers, campers and berry pickers, the almost daily presence of planes over their operations is the strongest kind of deterrent for carelessness or wilful setting of fires. I think it is safe to say that the seaplane or aeroplane with pontoons will be one of the most important aids to fire protection and forestry work that has so far been developed.

Mr. G. C. Piche, Chief Forester of Quebec, held a conference of the Managers of the Quebec Forest Protective Association on October 20, at the government nursery at Berthierville, and a visit was made to his plantations on the drifting sands at Lachute.

A party of about twenty of the Senators of the Dominion Parliament made a visit to the industries in the St. Maurice Valley and inspected the nurseries and plantations of the Laurentide Company. Senators White and Bostock, who are directors of the Canadian Forestry Association, were especially interested.

Dr. Hewitt, head of the Dominion Entomological branch; Professor Swaine, of the

same branch, and Clyde Leavitt, forester to the Commission of Conservation, visited the co-operative Forest Experiment Station of the Commission and the Laurentide Company, at Lac Edward, Quebec. Mr. Leavitt made the trip from Grand Mere to Lake Edward in a seaplane.

Mr. H. G. Schanche, Forester to the Abitibi Pulp and Paper Company, has commenced work on a map and estimate of their limits and is breaking up ten acres for a forest nursery. Mr. Mills, late of the staff of the Commission of Conservation, has joined his staff.

Lieut.-Col. George Chahoon, Jr., president of the Laurentide Company, and Mr. H. Biermans, president of the Belgo-Canadian Pulp and Paper Company, made flights in the seaplane and expressed themselves as being much pleased with the machine and convinced of its practical value.

Robson Black, secretary, Canadian Forestry Association, is leaving for a trip through the west to address meetings of the Canadian Creditmen's Association. Mr. Black is doing splendid work for forestry along the most practical lines and is rapidly educating the public to the necessity for properly using our forest resources.

Mr. A. D. Gilmour, forester of the Anglo-Newfoundland Development Company, is pushing rapidly a map and estimate of his company's limits and is also handling their logging operations. Base maps, showing lakes and rivers is already completed.

After a 750-mile trip on horseback, through the interior of British Columbia, M. A. Grainger, chief forester, reports the fires during the past season the worst since 1910.

That England with an area of less than the State of New York is planning to invest \$17,000,000 in a ten-year campaign to reforest 250,000 acres of land, inspires Dean Hugh P. Baker, of the New York State College of Forestry, at Syracuse, to comment on the need in New York State of particularly noting England's condition and her plans. Great Britain will replace for future commercial use the timber used in France during the war by this expenditure of many millions, while Dean Baker points out, New York has difficulty even in putting through a plan of co-operation with lumbermen and other private holders for steps toward the growth of timber for the future. He sees in all this a need for a definite forest policy for his state as well as for the nation.

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By Lutz Women's Club: Boys of Lutz and vicinity.

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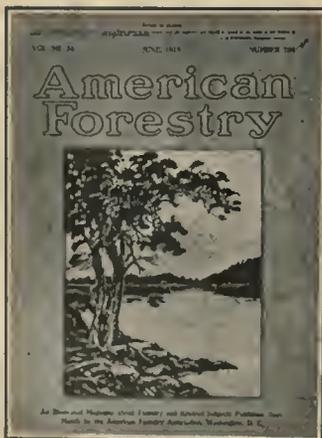
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STATE NEWS




NEW JERSEY

CO-OPERATION along a new line between the Forest Fire Service of the New Jersey Department of Conservation and Development and the State Highway Commission has been entered into with a view to decreasing the number of forest fires originating from highway construction.

The Forestry Department has provided a leaflet entitled, "Forest Fire Prevention and Highway Construction," which calls attention to the danger of using coal and wood burning machinery under any conditions and emphasizing the necessity for adequate spark arrester equipment where these fuels must be used. It urges a substitution of oil fuel or gasoline power just as rapidly and as universally as possible for all such machinery. It emphasizes the need for increased care in using fire for brush and refuse disposal, points out the legal requirements for such fires and makes suggestions as to methods and times of the work. It calls for greater emphasis by those in charge on the necessity for care by employes with smoking materials in and near the woodland areas. The pamphlet is illustrated with 10 cuts, featuring the points particularly stressed in the text.

The State Highway Engineer will hereafter enclose one of the pamphlets when sending specifications to all those bidding on highway work for his Department. Through the Highway Department the Fire Service will also be enabled to reach a large number of other contractors engaged in this sort of work throughout the State.

In addition, the State Highway Engineer is supplying the State Firewarden with the names of all those engaged in road construction and through road inspectors in the field is giving notice of the condition of all steam machinery used on each job, and particular notice of defective machinery or carelessness on the part of the contractor. This will permit the firewarden's field force to personally interview the foreman in charge of each job where the work is in or near the forested areas, and promptly deal with carelessness or indifference where necessary. Both the publication and subsequent personal interviews will point out to the contractors that responsibility rests with them for all forest fires resulting from any cause connected with their work even though by accident, as is provided by the State fire law. They will also be informed of the necessity for fire permits for using open fires for any purpose on the job and of where and how to obtain these permits.

Though the number of fires annually, coming from these sources is not a large

proportion of the total, and although they are among the most preventable, yet where carelessness or indifference on the part of the contractor is found, they have been among the most serious in several instances.

In his annual report, recently submitted to the Governor, the State Firewarden of New Jersey comments upon the fact that of the 796 forest fires, large and small, recorded during the calendar year 1918, responsibility for 432, or 54 per cent, was fixed upon some individual, or agent. There were also 59 cases involving technical violation of the fire permit law without ensuing fires. The penalties collected during the year, without reference to damage claims, amounted to \$2,956. Can any state or section surpass this record of effective fire law enforcement?

NEW YORK

ONE of the largest tracts of forest land ever approved for purchase by the state at a meeting of the Commissioners of the Land Office was acted upon favorably recently when the Conservation Commission's recommendation to purchase the Santa Clara Lumber Company's tract in Township 27, Franklin County, was approved. This tract involves practically 18,000 acres of wild forest land and comprises some of the most scenically beautiful sections of the whole Adirondack region, including the whole of Mt. Seward and Mt. Seymour. As soon as titles to the tract have been approved by the Attorney General's office this valuable area will be added to the Forest Preserve and be reserved for all time for the benefit of the people.

New York State will lead the nation in intensive application of forestry to idle lands, under plans now being formulated in Otsego County.

This county, whose hills and valleys, lakes and streams formed the setting for Cooper's Leatherstocking Tales, is organizing a system of county and township forests, on the basis of a forest survey made by the New York State College of Forestry at Syracuse. The plan is for each township to plant a forest of roughly 100 acres as a starting point, the several forests to be part of a county system, to be connected up with highways to make them accessible from all parts of the county, and all to be in accordance with a general plan. The township forest, however, will be the unit, and it is hoped by the Otsego County Improvement Association to have plans so far advanced that the first planting can be made next spring.

If this is done the New York State College of Forestry at Syracuse will send foresters to direct the work, as preliminary

surveys have already been made. The plan is to plant at least four township forests next spring, and increase the number by planting others in the fall, until all the twenty-four townships of the county will, within a short time, be actually growing trees for future generations.

The townships will buy the land and operate the forests but the organization work is being done by the Otsego County Improvement Association, which is just completing a membership campaign to give it \$25,000 a year for the promotion of this and three other general projects.

This project is probably the first in America for the planting and owning of a communal forest for future economic returns, and will be used by the New York State College of Forestry at Syracuse as a demonstration of the possibilities of forestry in New York State.

"The future of the Adirondacks depends upon the development of its hardwoods."

This declaration by Prof. Edward F. McCarthy, of the New York State College of Forestry at Syracuse, at the conclusion of three months of work with a party of foresters in the western Adirondacks, is his viewpoint upon the problem of forestry in New York State, and his work has a particular bearing upon the pulp and paper industry. Prof. McCarthy was assisted by Prof. H. C. Belyea, of the College of Forestry, and with three assistants the two men spent nearly three months in the Western and Northern Adirondacks where they maintained their camp. Considerable study was made in other portions of the Adirondacks, however, and important results were attained in a study of the reproduction of yellow birch.

The study was devoted entirely to yellow birch, which because of its present use to a small extent in the paper industry, and because of its rapid growth offers a possible solution for the threatening shortage of pulp wood for New York's paper mill investments of many millions of dollars. The study was to determine the value of yellow birch in the future of the Adirondack forest, and the study extended to birch in all types and conditions of forest growth.

The importance of the study is shown by the fact that the war census showed there was only about 5,000,000 cords of soft wood in private hands, the rest being in state forests, not opened for cutting. This would be a supply of only about five years for the mills, if they were not importing in great quantities from Canada to meet their needs.

The importance of birch is not only for its own use, if it can be so developed, but particularly in its relation to other woods, for it has always been a big factor, and will continue to be, in reproduction of any

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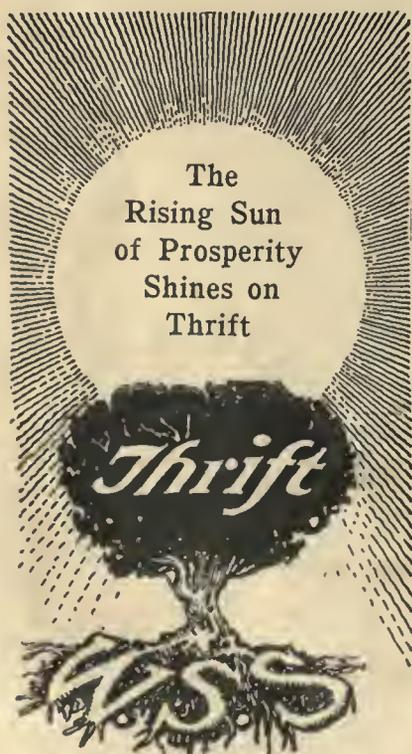
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forest, as a rapid growing protective cover for the slower growing hard woods.

The study made by the College of Forestry experts was to determine such elements as the rate of growth, reproduction, its relative growth compared to other hard and soft woods, in order to secure definite data on which to base future operations in the forests. The study was extremely detailed, for in some sections strip surveys were made to include every growing tree, even to those an inch in diameter on a typical plot.

That the replanted forest area grows more rapidly than was the case in the virgin forest is now definitely known. Just as the cultivated grain grows and produces more luxuriantly than the same grain prospered in a wild state, so do the trees grow faster, particularly in their early years, than was the case under natural conditions. The virgin forest contains trees which lived 250 to 300 years. Under favorable artificial forest conditions, if a replanted forest can be called artificial, the tree would reach a similar diameter in much less time, and the growth is particularly rapid in the earlier years.

"The future Adirondack forest will be largely hard wood," said Prof. McCarthy, returning from his survey, "and the problem now is to develop the market for the coming hardwood which is replacing the old soft wood forests, so that ultimately the maximum amount of softwood may 'come back' under a policy of conservation."

OHIO

THE annual summer meeting of the Ohio Forestry Society was held at Carbondale, September 12th and 13th. The members of the Society and their friends were the guests of the Carbondale Coal Company who provided an elaborate camp for the purpose.

The program consisted of trips over the forest plantations and the native woodlands of the Company and was supplemented by addresses which occupied one session.

The Carbondale Company is a pioneer in forestry practices. Its surface tract of approximately 3000 acres is mostly timbered. A large portion of the timber required to operate the mines is provided from their holdings. The Company operates its own mill, and all cutting on the tract is made in accordance with forestry principles.

Some 12 years ago, Colonel Richard Enderlin, president of the Company, undertook to reforest the old fields. The species used were largely tulip poplar, black locust and white and red pines. Definite areas have been planted annually since that time, and the plantings on the whole have been very successful. Considerable data may now be secured from these plantations which is of special interest to coal companies in Southwestern Ohio.

Colonel Enderlin gave a very interesting talk on "What an Army Cantonment Has Done for a Community." The Colonel was

chairman of the Chillicothe War Board and in that capacity had charge of much of the work in preparing for the large Chillicothe Cantonment. It was largely his executive ability and inherent leadership that made possible such rapid progress in completing this camp.

G. D. Cook in charge of the Cincinnati Municipal Forest told what the 10th Engineers accomplished in the forests of France.

J. W. Calland, Forester of the Miami Conservancy District, gave a splendid account of the big project under way to control the floods of the Miami Valley. The Conservancy District comprises 33,000 acres of land, which is divided into 5 retarding basins. These basins are the valleys of rivers and creeks, the confluence of which is peculiarly conducive to severe floods that have done much damage to the densely populated districts of the Valley in the vicinity of Dayton. The retarding basins are formed by the erection of immense earth dams from 400 to 500 feet in width across the valley at favorable locations. The completion of this project will render impossible the recurrence of such catastrophes as the 1913 flood.

F. W. Dean, Assistant State Forester, spoke of the French forests and forestry.

Edmund Secrest, State Forester, outlined the proposed Federal and State Forestry Program. He advocated:

1. A definite policy for the acquisition by the State of large areas of the rough sterile lands in some of the Southern Ohio counties. Some 250,000 acres could eventually be purchased by the State without the inclusion of any considerable agricultural surface.

2. A greater and more persistent campaign of education coupled with more material assistance to the owners of private woodlands.

3. Acquisition by cities of municipal forests.

4. More systematic and intensive research and experimentation, especially in forest management and utilization. Since the forests of the State are largely farm woodlands the problem of fire protection is not a formidable one, although it should receive attention in certain sections.

WISCONSIN

IN several Wisconsin counties the forest scourge known as white pine blister has secured a foothold to an extent that is causing the State Department of Agriculture apprehension. A field conference was called in Polk, Barron and St. Croix counties to consider means for staying the progress of the disease, and was attended by Commissioner C. P. Norgord, and the acting state entomologist, Dr. Fracker.

Among the men present were forest pathologists of the United States department, Brown and Syracuse Universities, and Prof. L. R. Jones, of the Wisconsin Agricultural Experiment station, in addition.

(Continued on Page 1500)

FOREST SCHOOL NOTES

UNIVERSITY OF CALIFORNIA

SINCE the last writing the Forestry Club has held two well attended meetings and planned for activities during the semester. A club hike will be taken to Lagunitas and Little Carson Canyons in Marin County on Sunday, October 12th. A large attendance is expected as the route of the trip lies through some very fine bodies of redwood and Douglas fir timber.

A get-together meeting of all students and faculty members of the College of Agriculture was held September 15th. Dean Hunt welcomed the 250 freshmen and the large number of former students and faculty returning from military service. His message to all was "Do something every day, don't just start something."

Professor Walter Mulford is taking a much needed vacation in the mountains of Santa Cruz County.

Professor Donald Bruce has gone to Portland, Oregon, to attend the sessions of the Pacific Logging Congress and Western Forestry and Conservation Association there.

The Forestry Club members are discussing the possibility of resuming publication of "California Forestry," the Club magazine which was discontinued because of the war. It is a big undertaking but a majority of the boys seem to feel that they can put it through successfully.

Ninety men of the Australian overseas forces have come to the University for several months' training before returning to their country. Most of the men are at the farm school at Davis. Lieutenant Norman Jackson, who plans to go into the lumber business with his brother in Australia is registered in several university courses. He enlisted in 1914, went through the Gallipoli campaign and served until the end of the war in France. He has many interesting stories to tell of incidents which occurred during his varied military service

UNIVERSITY OF IDAHO

MR. C. EDWARD BEHRE, recently returned from a two years' service overseas with the forest engineers, has accepted a call to an assistant professorship in forestry and arrived to take up his work October 1. Mr. Behre is a graduate of the Sheffield Scientific School, and received his master's degree in forestry from the Yale Forest School in 1917, graduating with highest honors. His training and experience fit him admirably for his new position, and he comes to it with strong recommendations from those who know his work.

I. W. Cook, associate professor of forestry, has resigned to accept an important position with a large lumber company. He has been with the School of Forestry sev-

eral years and has rendered both the University and the state splendid service in promoting the cause of forestry.

The ranger course offered by the School of Forestry is designed to meet the needs of rangers and guards wishing to prepare themselves for more rapid advancement; for young men planning to take the civil service examination for the position of forest ranger in the U. S. Forest Service; also for men connected with some phase of the timber industry who wish to acquire a knowledge of the general principles of forestry, but who cannot spare the time for a fuller course.

Young men never had so many reasons for making thorough preparation for their work as right now. This is especially true of those engaged in forestry and the forest industries, as the demand for men trained in these lines is far in excess of the supply, and opportunities for advancement were never better. This course offers a chance to share these opportunities. It is given at a time of the year when you can best get away from your work, yet each session is of sufficient length to enable you to make your training thorough.

Every facility of the School of Forestry is offered to short course students just as fully as to the students of the long course. The equipment for handling the work is complete and up to date. The work will consist of laboratory exercises, actual field practice, and lectures by the forest faculty, Forest Service officials, lumbermen and others.

Admission to classes is without examination. The work is of high school grade, hence any young man who has had the equivalent of eighth grade or grammar school preparation may attend. For further information apply to F. G. Miller, Dean, School of Forestry, University of Idaho, Moscow, Idaho.

NEW YORK STATE COLLEGE OF FORESTRY AT SYRACUSE UNIVERSITY

SWEDEN, through the American-Scandinavian Foundation, has sent a trained forester, A. E. F. Schard, to the New York State College of Forestry at Syracuse for special study in American methods in forestry, on an inter-change of students by which the United States sent Henry M. Melloney, of the New York State College of Forestry to Sweden for study there. Both men rank as fellows of the American-Scandinavian Foundation, and will get a handsome financial allowance to make possible their securing the best information possible on forestry methods in the countries to which they are sent. Mr. Schard came to this country to study particularly

PULPWOOD

TIMBER

ON

BLACKFEET NATIONAL FOREST MONTANA

The Forest Service calls the attention of paper manufacturers to a tract of timber on the North Fork of Flathead River, within the Blackfeet National Forest, Montana, and approximately 12 miles from Columbia Falls, on the Great Northern Railway. This area contains at least 500,000,000 feet of stumpage, 70 per cent of which consists of Engelmann spruce, hemlock, and other species suitable for wood pulp. Undeveloped water power is available in sufficient quantities for manufacturing purposes.

All information available concerning this area will be furnished upon request by the District Forester, U. S. Forest Service, at Missoula, Montana. The Forest service is prepared to consider terms of sale for this stumpage on a basis which will make the installation of a plant for the manufacture of paper feasible. Inquires are invited.



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timber transportation and commercial phases of forestry, and a special course has been arranged at Syracuse to permit him to do the special work which will be of value to him and promote international relations.

Mr. Schard has been in the Swedish forest service since his graduation from one of the big universities of his native land, and has traveled extensively in Germany and France and other countries studying forestry methods. He is one of the first students ever sent to the United States for forestry study under the operation of the American-Scandinavian Foundation and the recognition given the New York State College of Forestry is accentuated by the fact that this year marked the first time that the Philippine government has sent a student to Syracuse for forestry study, in the person of Luis J. Reyes, who was in the Philippine forestry service six years before coming here for special study.

A surprising demand from American industry for men trained in forestry has been disclosed through the placing of graduates the past few weeks by the New York State College of Forestry at Syracuse. The demand for men not alone from concerns in the lumber industry, but especially from industries using the products of the forest in manufacturing. Announcement has been made of the placing of seven foresters who are returned soldiers, and of three other recent graduates of the College of Forestry in positions applying to practical life the training given in forestry.

OREGON STATE COLLEGE OF FORESTRY

PROF. H. S. NEWINS, who spent more than a year with the Aircraft Production Division of New York, as inspector of timber used in airplane construction, is back in his former position as Professor of Forestry in the Oregon State College. He made the trip from Brooklyn, New York, to Corvallis, Oregon, by auto, covering the distance in thirty days.

Forty members of the School of Forestry attended the sessions of the Pacific Logging Congress in Portland, October 8-10.

P. F. Shen, a junior student of the School of Forestry, who hails from the south of China, is completing his course in the Yale Forest School. Shen plans to cover the principal forest regions of the United States and then return to his own country to aid in working out forestry problems there.

At the sessions of the Pacific Logging Congress, held in Portland, October 8-10, the following Forest School men were in attendance: E. T. Clark, Professor of Logging Engineering, Washington State University; Donald Bruce, Professor of

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Forestry University of California; Dorr Skeels, Dean of the Forest School of Montana; E. M. Buol, Professor of Logging Engineering; H. S. Newins, Professor of Forestry, and G. W. Peavy, Dean of the School of Forestry, Oregon State College. During the Congress these men held a round table discussion relative to the problems peculiar to the western forest schools.

PENNSYLVANIA STATE FORESTRY SCHOOL

PROF. C. R. ANDERSON has been appointed Extension Representative in Forestry. He will continue to give the courses in Management and Finance in the Forestry School and devote a portion of his time to woodlot work in the state.

The enrollment of students in Forestry is as follows: Seniors, eight; Juniors, seven; Sophomores, twenty-four; Freshmen, twenty.

C. B. Davis, '17, is Forest Assistant to H. G. Schanche, '18, Forester, with the Abitibi Power & Paper Company of Canada. L. G. Baltimore, '18, is City Forester of Harrisburg. Charles Claxton, '17, has resumed his position in charge of the Forestry Department at the Lincoln Memorial University, Tennessee. H. E. Richards, '16, and O. B. Gipple, '15, are again with the Wheeler & Dusenbury Lumber Company at Endeavor, Pennsylvania, working under the direction of R. R. Chaffee, Harvard Forest School, 1910, Forest Engineer for the company. Chaffee had charge of the courses in Lumbering at Penn State for several years before engaging in practical work in Lumbering. R. A. Zeller, '15, is Forest Examiner on the Chugach National Forest, Ketchikan, Alaska. He writes that he finds many foot-prints of G. L. Drake, '12, who formerly held this position.

STATES RECEIVE GOODLY PORTION OF NATIONAL FOREST RECEIPTS

THE total receipts of the National Forests of Arizona for the fiscal year that ended on June 30 last were, \$511,380.70, and the receipts of the New Mexico forests for the same period were, \$358,735.69. The Arizona forests ranked second of all the states in receipts, being outranked only by California. New Mexico stood sixth from the top.

Of these receipts the state of Arizona and its counties will receive \$171,928.80 for roads and schools, and \$45,261.18 in addition will be spent by the Forest Service in building roads within the forests. This latter fund is known as the ten per cent fund and is altogether distinct from the \$10,000,000 Forest Service road fund provided in last year's post office appropriation bill.

Of the receipts from the New Mexico forests, the state and counties of New Mexico receive \$104,752.54 for roads and schools, and an additional sum of \$33,864.42 will be spent under the ten per cent provision for roads.



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* This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.

STATE NEWS

(Continued from Page 1496)

tiation to several representatives of the Wisconsin department of agriculture, who acted as hosts.

After going over conditions in Wisconsin, a brief trip was made through the infected area in Minnesota, where conditions are even more serious than in this state. A publicity campaign among pine owners, showing practical control methods, is being started. The progress of white pine blister is slow and hope of limiting its spread is held.

SEED BURNED FORESTS BY USE OF AIRPLANES

THE Forest Service has been urged by Representative Randall, of California, to start a re-forestation program for the fire-denuded areas in the Sierra-Madre Range by using airplanes to scatter millions of tree seeds over these mountains as soon as the rainy season begins. After his conference with Service officials, Mr. Randall wired civic organizations in Pacific Coast cities to organize Forestry Services to press action by the Government.

BOOK REVIEWS

"Forest Products—Their Manufacture and Use," by Nelson Courtlandt Brown, John Wiley & Sons, New York. 471 pages, 120 figures, \$3.75 net. To those who are interested in the chief commercial features involved in the principal forest industries, lumber excluded, this book will be most welcome as filling a much needed gap in American forestry literature on the principles and practices followed in the production of materials which, from the viewpoint of invested capital and value of products, are of greater importance, collectively, than lumber. The subject is presented clearly and interestingly but necessarily with brevity as it would not be possible to treat in detail the many topics covered in one volume. This is exemplified by the following subjects, each treated in a separate chapter: General introduction—Original forests—History of lumber cut; Wood Pulp and Paper; Tanning Materials; Veneers; Slack Cooperage; Tight Cooperage; Naval Stores; Hardwood Distillation; Softwood Distillation; Charcoal; Boxes and Shooks; Cross Ties; Poles and Piling; Posts; Mine Timbers; Fuelwood; Shingles and Shakes; Maple Syrup and Sugar; Rubber; Dye Woods and Materials; Excelsior; Cork. The values and conditions used are, to a large extent, given for the period prior to the participation of this country in the war, Commissioner Brown deeming this advisable because of the wholly abnormal and somewhat temporary conditions brought about by the war itself. Brief bibliographies, which were used to some extent as sources of information, are appended at the end of each chapter, and can be consulted for further study in each subject. Much of the data given have been obtained by Commissioner Brown during his personal investigation and inspection of operations in the South, the Lake States, the Northwest and the far West, while some of the material was collected on his trips to various European countries.

"The Condensed Chemical Dictionary," a reference volume for all requiring quick access to a large amount of essential data regarding chemicals and other substances used in manufacturing and laboratory work. Compiled and edited by the Editorial Staff of the Chemical Engineering Catalog, F. M. Tumer, Jr., Technical Editor. The Chemical Catalog Company, Inc., New York. Price, \$5.00. This book differs from the ponderous reference books of the technical laboratory in many respects other than its small size and compactness. It is written for the business man, the lawyer—the man in the street with only a slight knowledge of chemistry, as well as for the professional chemist. Information of all kinds, some of it not



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FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

POSITION wanted by technically trained Forester; college graduate, 37 years of age and married. Have had seven years' experience in the National Forests of Oregon, California, Washington and Alaska. Also some European training. At present employed on timber surveys as chief of party in the Forest Service. Desire to make a change and will be glad to consider position as Forester on private estate, or as city Forester. Will also consider position as Asst. Superintendent of State Park and Game Preserve in addition to that of Forester. Can furnish the best of references. Address Box 820, care American Forestry Magazine, Washington, D. C.

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

An Opening For One Hundred Foresters

The position is that of Division Firewarden; the territory is approximately one-third of the State of New Jersey; the work is general administration of all forest fire matters together with attendance at large fires, investigation of the causes of fires, supervision of the personnel of the local firewarden service, about one hundred men, and responsibility for the publicity and propaganda fire prevention work in the territory. The compensation is \$1,200 to start, with every likelihood of increase shortly, the qualifications are that a man shall be a graduate of some reputable technical forestry school. The reason for requiring technical training is that advancement may be either in the forest fire work or in the technical forestry activities of the Department and in addition the incumbent is called on during the slack season for forest fire work, to do technical and propaganda forestry work in his territory. Apply Box 830, care American Forestry, Washington, D. C.

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, Care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, Care American Forestry Magazine, Washington, D. C. (1-3)

Man to be discharged from the Army September 30th desires position in forestry work, with lumber or railroad company or assisting in investigations of utilization of wood products. Would accept position in other work. Is married man, graduate of Michigan Agricultural College, 1913. Has had experience in orchard work, clearing land, improvement cuttings, planting and care of nursery, pine and hardwood transplants, orchards and larger trees, grading and construction of gravel roads, and other improvement work. Has executive ability and gets good results from men. Please address Box 860, care of American Forestry Magazine, Washington, D. C. (9-11)

FORESTER wanted as Division Firewarden in New Jersey. Must have professional training and some experience. Salary \$100 to \$120. Eligible for promotion to Assistant Forester. Civil Service examination can be taken after provisional appointment or by mail. Box 810, care American Forestry Magazine, Washington, D. C.

WANTED—Position as Forester and Land Agent. Technically trained forester, 35 years old. Practical experience along all lines included under the duties of the above positions. Former Captain, Field Artillery. Address Box 840, care American Forestry, Washington, D. C.

WANTED—Position with Lumber Company or Private Concern by technically trained Forester with five years practical experience. Box 820, care American Forestry.

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strictly chemical, is packed in its more than 500 pages—fire risk in shipping, kind of containers employed, commercial uses, and the like—and yet it is so scientifically accurate that it will no doubt be added to every library on technical chemistry. The mystery of the alchemists still obtains in the field of chemical nomenclature and terminology to the average man. The Condensed Chemical Dictionary is especially designed to make chemical terms available and understandable to this audience, and is admirably fitted to do this by the editor, F. M. Tumer, Jr., and his several technical advisers.

"Timber—Its Strength, Seasoning and Grading," by Harold S. Betts. McGraw-Hill Book Company, Inc., New York. 234 pages, 27 tables, 107 illustrations. Price \$3.00. In readily accessible form, this book presents important technical data and in-

formation on wood. This is the first adequate book on wood as an engineering material. It treats the subject in a direct, practical way.

As indicated by the subtitle, the book covers testing, seasoning and grading. Both hard and soft woods are considered. The data given are derived almost entirely from tests and investigations on the mechanical properties of wood made by the Forest Service of the United States Department of Agriculture. The material may therefore be regarded as reliable.

The various chapters cover:

I. Timber Resources of the United States. II. The Strength of Wood. III. Effect of Moisture and of Preservative and Conditioning Treatments on the Strength of Wood. IV. Strength of Wooden Products. V. Seasoning of Wood. VI. Grading of Lumber by Manufacturers' Associations. VII. Lumber Produced and Used in the United States.

The information offered is invaluable to every man who uses, sells or manufactures wood and wood materials.

"The Hidden Aerial," by Lewis E. Theiss. W. A. Wilde Company, Boston, Massachusetts. 332 pages. Price, \$1.35 net. This story will appeal to any boy who likes life in the open, or who is interested in radio communication. Primarily it is the story of a band of boys who enlisted in the boys working reserve to serve their country during the war; secondarily it is the story of a wireless spy hunt. Some of the characters which Mr. Theiss has introduced in his other wireless stories appear in this volume, for, being too young to engage in other war work, they joined the boys working reserve for service on the farms. However, their wireless training serves them well when called upon to engage in a hunt for hidden wireless apparatus.

It is an interesting story, with clean, wholesome characters, ever alert, ever anxious to play their part in every adventure which comes.

The volume is illustrated with color frontispiece and black and white illustrations.

VERDE STRIP ADDED TO NATIONAL FORESTS

PRESIDENT WILSON has signed the proclamation which adds the so-called "Verde Strip" to the Coconino and Prescott National Forests in Arizona, according to word received by the local district office of the Forest Service. The total area added is 179,290 acres, and extends along the Verde River from below Rutherford to above Cottonwood. The addition was made chiefly because the Reclamation Service desired to have this area brought under Federal regulation and control in order to protect the Verde watershed from overgrazing and erosion. The stockmen and settlers within the area were favorable to its addition to the National Forest territory adjoining.

R. H. RUTLEDGE PERMANENTLY IN CHARGE OF DISTRICT ONE

PERMANENT adjustment of the executive forces of district No. 1 of the Forest Service, as approved by the Secretary of Agriculture and the Forester at Washington, D. C., have been announced at the Missoula headquarters of the district.

First and most important of all is the appointment of Richard H. Rutledge as District Forester in charge of all national forests in Montana and northern Idaho. Mr. Rutledge has been acting District Forester since the departure of F. A. Silcox in the summer of 1917 and his appointment as Chief of the district is now made permanent, a fact which is especially pleasing to his subordinates and his many friends in Missoula and vicinity.

Mr. Rutledge is a veteran of the Forest Service, having first entered it as a ranger at Fayette, Idaho, in 1905, 14 years ago. In 1907 he was appointed supervisor of the Coeur d'Alene forest, and in the fall of 1908 came to Missoula as Assistant District Forester of operations in the district, and has remained here since. In 1910 he became Chief of the Department of Lands, remaining in that position for four years until transferred back to operations in 1914. As mentioned before, he succeeded Mr. Silcox when the latter left for Washington in 1917.

COMMENT ON TROPICAL WOODS

REFERRING to an article which appeared in the August issue of AMERICAN FORESTRY, entitled, "Uncle Sam, Lumberman, Canal Zone," Mr. C. H. Pearson, an expert on foreign and domestic cabinet woods, makes interesting comment. Mr. Pearson said in part: "Lignum vitae does not grow in the Canal Zone, nor are cacti found there as shown in one of the illustrations. The other scenes are probably from Porto Rico or Cuba where this Almendro de la India is planted as a shade tree. The Lignum vitae referred to by the author is a spurious variety called locally Guayacan, which happens to be the Spanish name for true Lignum vitae. Not a pound of this wood was ever used by any of the Navy Yards in this country, because it was found entirely unfit for the purpose intended. The Almendro to which the author refers in the text is a native forest tree of large proportions and is botanically distinct from this introduced species illustrated and locally called Almond. Special attention is called to the grotesque shapes assumed by these trees as a result of the tropical winds, but the traveler in Panama is well aware that there are no localities in the Republic where the wind is permanently in one direction which would give shade trees this form and outline. This is another reason to believe that the pictures were taken on the south coast of Porto Rico or some other island of the West Indies."



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SCHOOL BOYS MOBILIZED IN REFORESTATION PLAN

MOBILIZATION of thousands of youngsters for service in systematic flood control work around Los Angeles has been completed. In addition to obtaining cooperation of the principals of the high schools, County Forester Flintham was authorized by the Board of Supervisors to obtain 200,000 young trees for planting back of piling defining the stream channels. These will be of hardwood varieties, which will establish themselves firmly without spreading into the stream channel.

In the seed-gathering campaign beginning immediately, there will be a systematic plan. Approximately fifty boys a day will be kept on the job indefinitely. The gathering of seeds is authorized by the school principals and will be done in school time under the direction of teachers of the schools from which the boys come. Some twenty varieties of brush seed will be gathered for planting in the areas swept by the recent forest fires. It has been found that considerable care will have to be exercised in

planting the seed, as the warm weather following the first big rain of the season made a crust over the hillsides. The seed will have to be raked in to be effective.

SCOPE OF THE FOURTEENTH CENSUS EXTENDED

THAT the Fourteenth Decennial Census, on which the actual enumeration work will begin January 2, 1920, is to be the most important ever taken is shown by the fact that the Act of Congress providing for this census expressly increased the scope of the inquiries so as to include forestry and forest products, two subjects never covered specifically by any preceding census act.

The compilation and gathering of forestry and forest products statistics will be in charge of a special force of experts. The accurate and comprehensive figures gathered concerning this vital natural resource will be much in demand, and the comparisons made with conditions existing before the war will be of great interest.

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REFORESTATION OF PORTO RICO IS PLANNED

THE reforestation of Porto Rico along scientific lines is about to be undertaken. Robert Murray Ross, an expert in forest planting, recently arrived at the experimental station in Rio Piedras, fully equipped to undertake the big problem, but had barely entered upon his duties when he was offered a position in Santo Domingo paying him a very much larger salary and so resigned to accept the Santo Domingo position. E. Murray Bruner, Supervisor of the U. S. Forestry Service in this island and Chief of the Porto Rico Forestry Service, in writing of the practical plans to be inaugurated, says:

"This is a work of immeasurable magnitude in its importance and possibilities. The field is unlimited, while the need is immediate and urgent.

"There is no country in the Western Hemisphere in more acute need of extensive reforestation than Porto Rico. The inhabitants of no other part of America suffer so much from the deprivation of essentially needed fuel wood, native lumber and related forest products. Nowhere else is the per capita consumption of wood so small as in Porto Rico. Nowhere else has deforestation, due to destructive methods of exploitation become so nearly complete. Originally as completely covered with as rich a forest as could be found in this part of the world Porto Rico today presents the sad spectacle of a country literally stripped of its forest wealth and entirely dependent upon importation of all classes of lumber and construction timber while more than 50 per cent of the total land area lies completely idle except as it supports a practically worthless growth of coarse grasses and brush.

"The cost of substantial and comfortable homes built of wood has become so exorbitantly high as to be out of reach of even the moderately well to do, while the poor can aspire to no home superior to a miserable shack built of scraps of wood and other cast away materials. Rents are excessively high. Fuel wood is so scarce and costly that the poor must depend upon such fagots and twigs as the women and children are able to gather up in their tiresome and incessant searches, even the heavier and harder portions of the palm branches being eagerly sought. Poles, posts and fencing materials can hardly be had at all. Even the small sized cross ties required by the new narrow gauge railroads must be imported from Santo Domingo, the scrubby and generally despised mesquite under the dignified name of "bayahonda" furnishing the bulk of these ties which cost the consumer about one dollar per tie. Sawmills for the manufacture of native lumber are unknown. Lumbering as an industry has disappeared.

"And in the face of all this we are confronted with the absolute fact that the sup-

ply of southern yellow pine upon which we are so nearly completely dependent for all ordinary construction, will be exhausted, in so far as the general market is concerned, within 14 years, and that within five years the remaining original supply will be in the hands of so few mill operators that effective competition in prices will have disappeared.

"The time is at hand when the people of Porto Rico must arouse themselves to this deplorable economic and social condition, for it vitally affects every home, every individual in the Island. Earnest energetic and concerted attention must be directed at once to the solution of the forestry problem. And the only solution must come through the intensive practice of reforestation on a large scale, the planting of fuelwood, and lumber producing trees on thousands and hundreds of thousands of acres of idle lands from which the once potentially rich forests have been so destructively removed.

CARRIER PIGEONS AID FORESTERS

DURING the recent severe forest fires in certain sections of the West, carrier pigeons were successfully employed to convey messages from the fire fighters "at the front" to headquarters. The test of the birds for this use was on a limited scale but has encouraged the Forest Service officials to believe that they can be employed profitably on a larger scale.

The experiment lends special interest to a plan which is being considered for co-operation between the Department of Agriculture and the Navy Department, under which carrier pigeons and equipment of the latter department may become available. To establish a successful carrier pigeon system it will be necessary to lay plans during the coming winter, to have the posts properly located, and get the birds acclimated and begin their training. Flights of 600 miles in a single day have been made, while a distance of 140 to 200 miles means a two or three hour flight for the average bird. Since the distances which would be covered in Forest Service work are considerably less than this there appears to be no difficulty in this regard. In most instances the flights from fire fighting areas to headquarters would be considerably less than 50 miles. The value of the birds would be particularly great in mountainous regions where travel is difficult.

FOREST FLYER KILLED

LIEUT. J. WEBB, of Glendel, California, was killed, and Sergt. John C. McGinn, of Salt Lake City, was seriously injured when the airplane Lieutenant Webb was piloting fell in a tail spin and crashed to the earth at Medford. The aviators were on fire patrol duty.

12-05

AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor



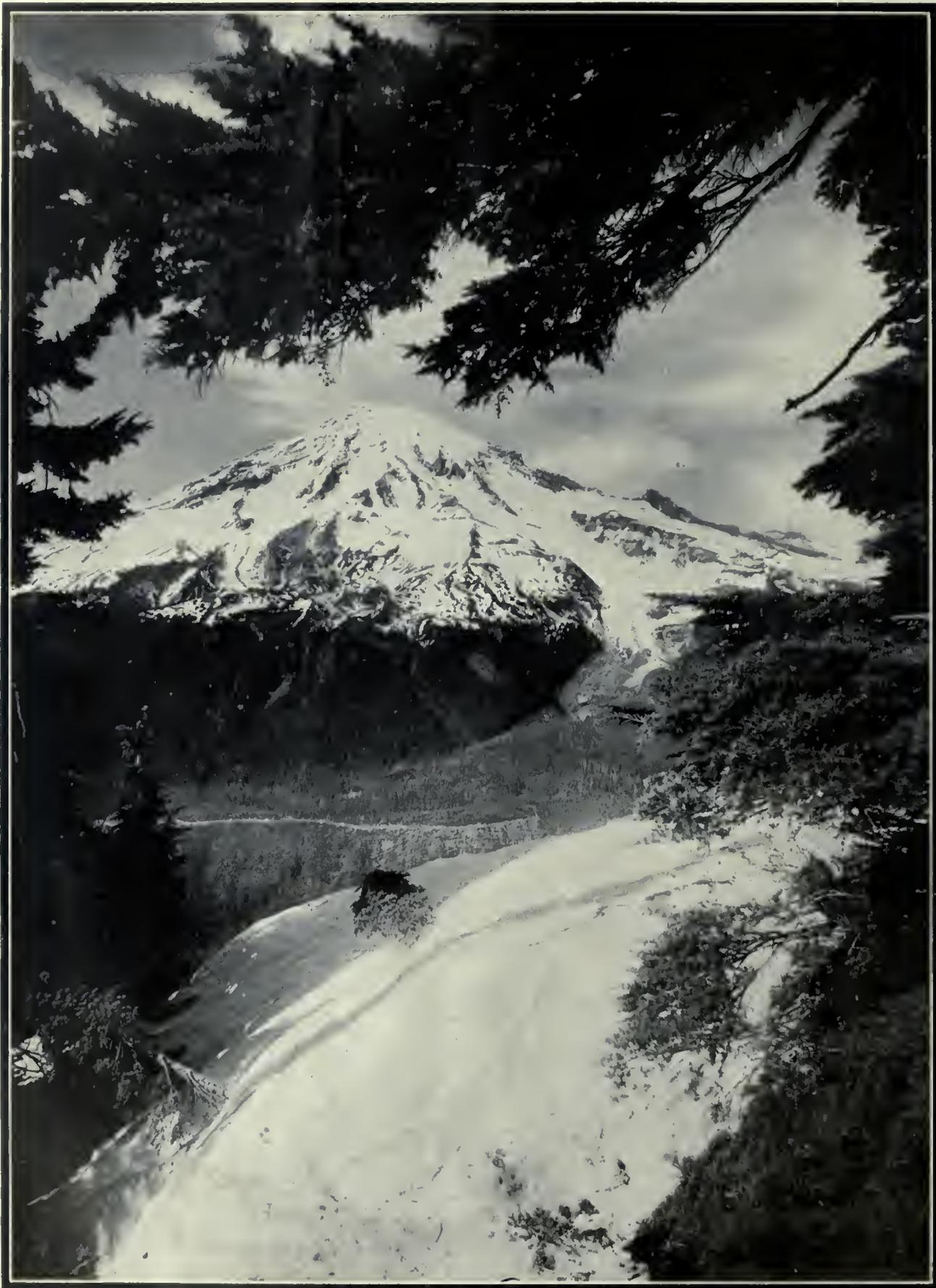
IN STRONG CONTRAST TO THE GLEAMING HEIGHTS ABOVE ARE THE SENTINEL TREES WHICH NESTLE AT THE FOOT OF THE FAMOUS MISSION RANGE IN MONTANA

DECEMBER 1919

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CHRISTMAS ON MOUNT RAINIER

AMERICAN FORESTRY

VOL. XXV

DECEMBER, 1919

NO. 312

NATIONAL FORESTS AND THE WATER SUPPLY

BY SAMUEL T. DANA*

FEW people need to be reminded that the prosperity of the West depends largely upon an adequate supply of water for irrigation. Water, rather than land, is the open sesame to the agricultural development of the semiarid regions. Vast areas of rich soil await only water to make them "blossom like the rose." To other vast areas water has already been brought from varying distances, and these are now among the most productive of all our agricultural lands. Irrigation alone is responsible for the sugar-beet fields of Utah, the alfalfa fields of Idaho, and the orange groves of California.

So literally has water meant wealth to the Rocky Mountains and Pacific Coast States that the "Golden West" no longer need base its claim to the title on the magic metal that brought it fame and prosperity in the early days. The gold of the grain field and of the citrus grove is now worth more than the gold of the mine. The \$247,000,000 which represents the annual value of the crops produced on the 150,000 farms comprising the 13,200,000 acres of irrigated land in the West is nearly three times as great as the value of the precious metals produced annually in the same region. Colorado, preeminently a land of minerals, now produces each year on irrigated lands a

crop worth more than the entire product of its mining industries and approximately twice as much as the output of precious metals. California, the "Golden State," contributes annually nearly four times as much wealth in crops as in precious metals.

If the precipitation were as evenly distributed in the West as it is in the East, there would not be the need for irrigation that now exists, and the main purpose of the National Forests would be simply timber production. But it is not evenly distributed, and that is where the trouble lies. Except for a narrow strip along the Pacific Coast from San Francisco north to the Canadian line, the great bulk of the precipitation occurs in the mountains.



HOW THE FOREST GIVES SERVICE

What the National Forests mean to the water user may be summed up in one word "service"—service that is none the less real because it is not always obvious and because its exact value can not always be expressed in dollars and cents. Every user of water which originates in the National Forests—and this includes by far the greater number of water users throughout the West—must look to the Forests for safeguarding his supply.

Throughout the Coast Ranges, the Cascades and Sierra Nevadas, and the Rocky Mountains and Colorado Plateau the rain and snowfall is far greater than in the intermediate valleys and plateaus.

The result is that the majority of water users depend for their supply on water that originates a considerable distance away. Some of the most productive agricultural lands in the region receive hardly more than enough precipitation to support a desert vegetation, while the evaporation is correspondingly great. Greeley, Colorado;

*Courtesy U. S. Dept. of Agriculture, Forest Service.



WHAT WATER WILL DO. WITH—WHERE THE ORANGES GROW

The orange groves and other irrigated lands in the foreground obtain their water from the mountains in the background, which are included in the Angeles National Forest, California. At the lower elevations these mountains are covered with a dense growth of brush, or chaparral, while at the higher elevations are forests of western yellow pine, Jeffrey pine, and other trees. The value of citrus fruits produced in the eight southernmost counties of California in 1914 is estimated by the Los Angeles Chamber of Commerce to have been \$33,000,000.

Provo, Utah; Phoenix, Arizona, and Fresno and Riverside, California, all of which are in the center of extremely productive sections, have an annual precipitation of less than 15 inches with an annual evaporation from a free water surface at least three or four times as much.

As a natural consequence of the difference in amount of precipitation in the mountains and at the lower elevations, the former are generally forested and the latter treeless. The National Forests, of course, are located in the mountains, where the trees are. From the brush-covered foothills of the San Jacinto and San Bernardino Mountains in southern California to the magnificent Douglas fir forests of the Olympic Mountains in northern Washington, and from the pinon and juniper stands of the southern Rockies in New Mexico to the pine forests of the northern Rockies in Montana and Idaho, the mountains and the National Forests coincide.

An intimate relation exists between the National Forests and irrigated lands throughout the West. At least 85 per cent, and very likely more, of the water

used to irrigate these 13,200,000 acres, whether it comes from surface streams and lakes or from underground sources, has its origin in the mountains where the National Forests are located. Obviously, not all of this mountain area is forested, nor is all of the forested area under Federal ownership. At the same time, the National Forests include a large part of the area from which the bulk of the irrigation water is derived, and must therefore exert an important influence on the amount and character of the supply.

No figures are available as to the exact value added to these lands by the application of water, but it unquestionably runs into the hundreds of millions of dollars. Without water much of this area would be practically worthless, and the value even of that portion on which dry farming is feasible would be greatly reduced. In the vicinity of Salt Lake City, Utah, for example, irrigated lands deriving their water from the Wasatch National Forest are valued at from \$100 to \$1,000 per acre, with an average of probably \$400 per acre; while land without water in the same district, except where it requires drainage, is

practically valueless. Near Los Angeles, California, unimproved lands with water rights are worth from \$200 to \$500 per acre, while bearing orange or lemon groves may be valued at \$3,000 or even more per acre. What the water supply protected by the Angeles National Forest

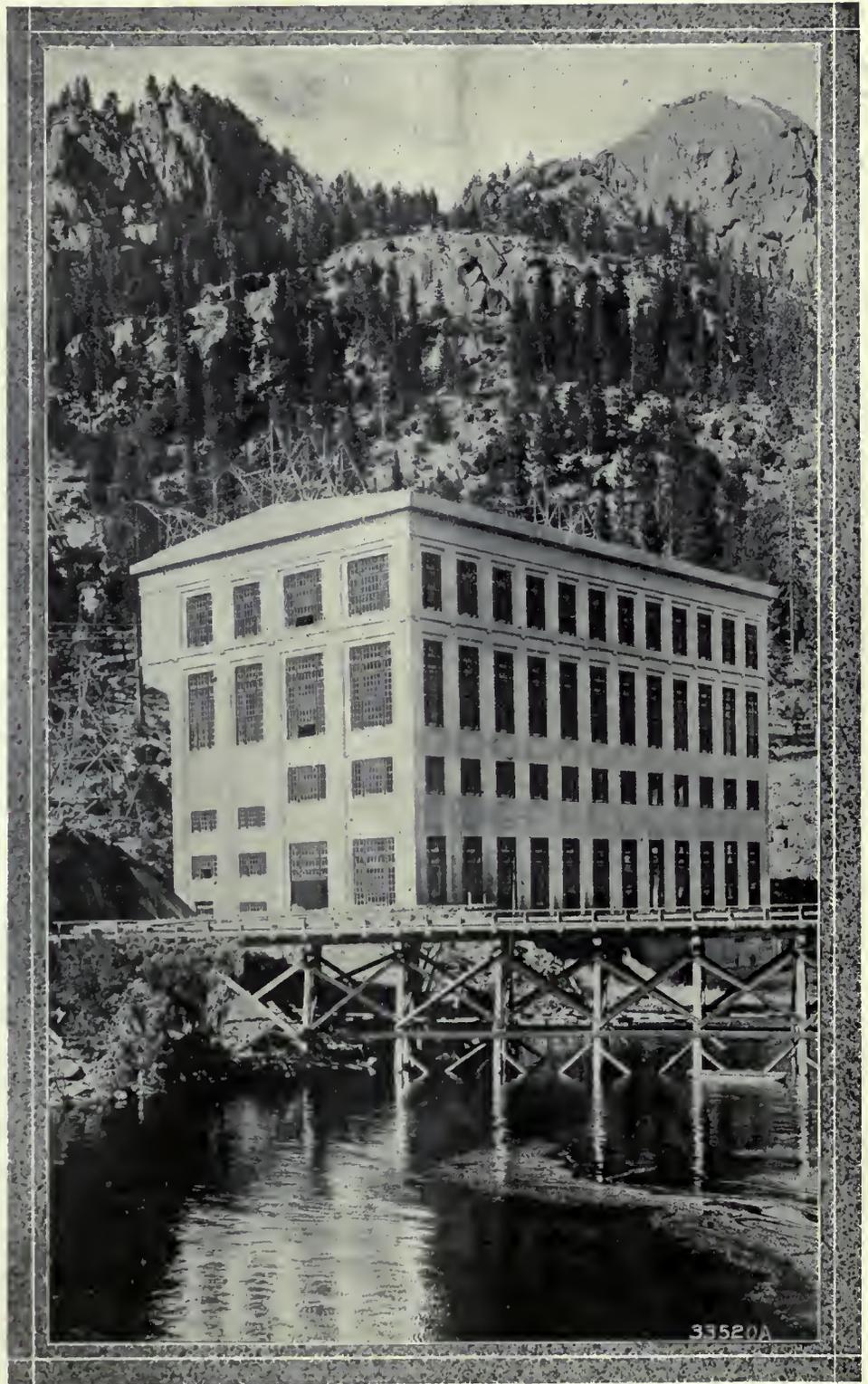


WITHOUT—WHERE THE AGAVES GROW

Semi-desert land near Silver City, New Mexico, now used during part of the year as stock range. If irrigation were possible many of the desert areas throughout the West could be converted into fertile agricultural land. Water, rather than soil, is frequently the decisive factor in determining whether cultivation is practicable.

means to this region is also well illustrated by the value of the crops produced on irrigated lands that without water would be of little or no agricultural value. In 1915, 25,750 acres devoted to citrus fruits, alfalfa, and sugar beets, deriving their irrigation water from the San Antonio watershed, with an area of only 24 square miles, yielded crops valued at \$5,400,000; while 5,870 acres of citrus fruits, deriving their water from the San Dimas watershed, with an area of only 18 square miles, yielded crops valued at \$2,600,000.

Irrigation represents one of the vital needs for water in the West, but there are others. Water is the "white coal" which furnishes or will furnish the motive power for lighting systems, trolley lines, and manufacturing plants everywhere in the Western states. As such it constitutes an immensely valuable resource. The western mountains contain more than 72 per cent of the potential water power of the United States. Through lack of markets, only a comparatively small part of this has been utilized, but in the last 20 years great strides have been made in development. In the decade from 1902 to 1912, for example, water-power development in the Western states increased 451 per cent, or more than four times as rapidly as in the rest of the country. How rapidly water power is developed in the future will depend solely on how many new industries and people make their home in the West. Judging by how many have gone there in the past, the demands of the Western states upon their "white coal" will continue to multiply. No less than forty-two per cent of the water power resources of the eleven Western states, or approximately 31 per cent of the water-power resources of the entire country, is actually within the National Forests. Moreover, a large part of the remaining power, although developed outside of the Forests, is derived



WHERE "WHITE COAL" IS TRANSFORMED INTO ELECTRICITY

A power plant on the Sierra National Forest, California. The pipe line has a drop of 2,000 feet. The National Forest contains 42 per cent of the water power resources of the West. These can be developed by private interests upon payment of an annual charge and under restrictions that protect the public against monopoly.

from streams rising in them. In 1915 nearly 42 per cent of the water power already installed was developed by plants some part of which occupied National Forest lands or which were directly dependent on storage reservoirs constructed on National Forest lands, and 13.6 per cent more was similarly dependent on other "public

lands. Even these figures, however, do not bring out the full significance of the National Forests in their relation to the water-power resources of the West. A large part of these resources outside of the Forests are so located as to be extremely difficult of development under present conditions, and so a continually increasing proportion of new water-power developments is utilizing sites within National Forests or other public lands.

Farther downstream, in the lower reaches of the rivers and in the harbors into which they flow, water contributes still further to western prosperity. Inland water transportation in the Mountain and Pacific states will never attain the development of which it is capable in the Eastern and Central states but it is already of considerable importance, and should become increasingly so as the population grows denser and traffic correspondingly heavier.

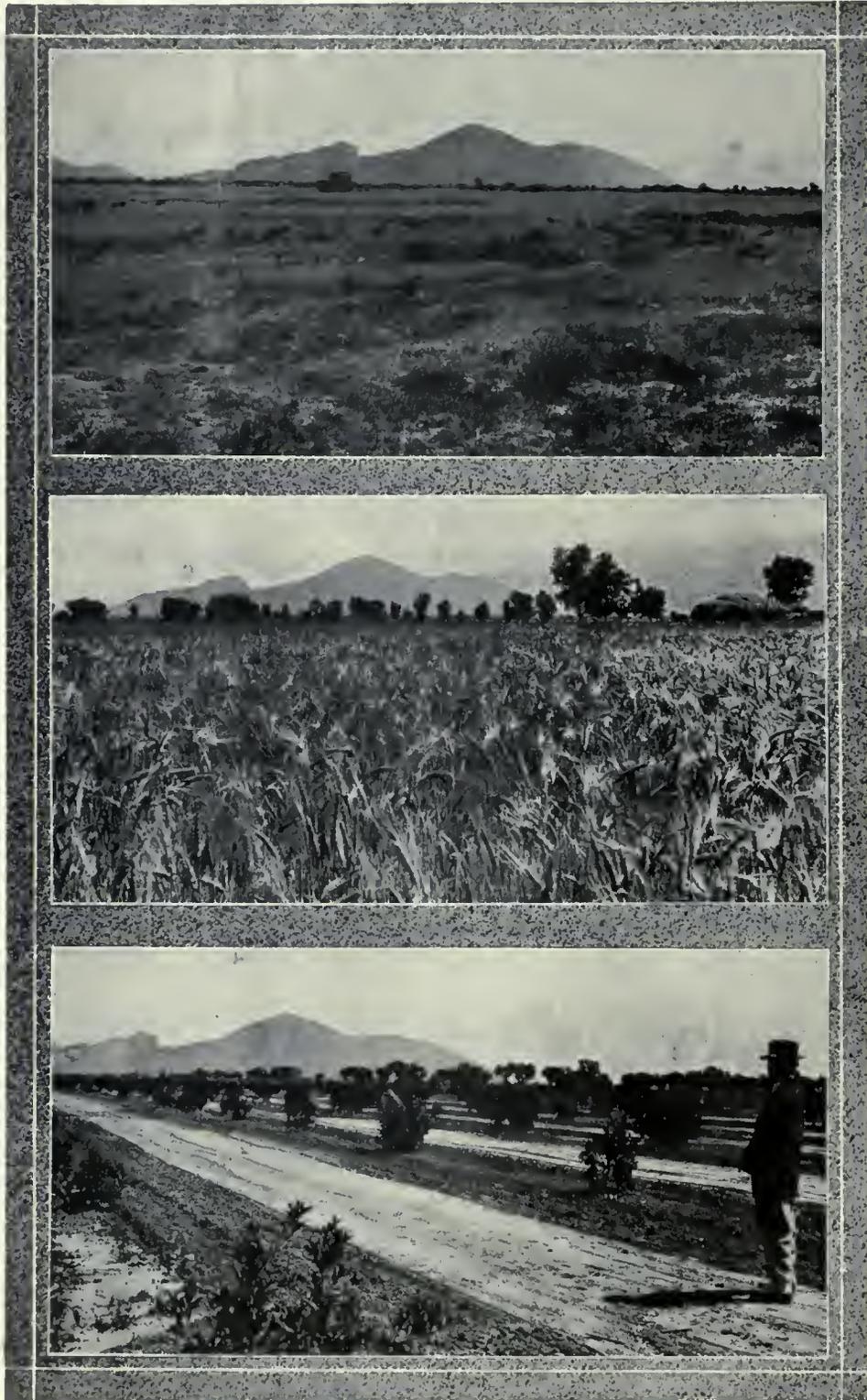
According to the 1916 report of the Chief of Engineers, United States Army, there were at that time some 26 navigable streams in the Western

States, with a navigable length of approximately 1,746 miles and an annual movement of over 14,000,000 tons valued at more than \$250,000,000. The

relation of the National Forests to navigation is not strikingly obvious, since practically all the navigable portions of western streams lie outside of the Forest boundaries. Yet by far the greater part of the water that they carry originates in their upper courses, which are to a large extent included within the National Forests. Any influence that the Forests may exert on this water is therefore felt indirectly, but none the less surely, by the streams and by the harbors into which they flow.

Ordinary drinking water may lack the romantic associations of some other beverages, but it nevertheless is an everyday necessity for thousands of families scattered on farms and ranches and in numerous small settlements throughout the

West and for the still larger population comprised in the towns and cities. How much effort and money must be expended by western cities in obtaining a pure and



BEFORE AND AFTER

Upper.—A portion of the Salt River Reclamation Project in southern Arizona previous to irrigation, covered only with a sparse growth of desert vegetation.
Center.—The same area after water has been applied, covered with a vigorous crop of barley.
Lower.—The same area several later, covered with a thrifty young orange grove.

abundant water supply is shown by the examples of Los Angeles and San Francisco, the first of which has considered it worth while to spend some \$25,000,000 to bring water from Owens Valley on the east side of the Sierras across 250 miles of desolate and rugged country; while San Francisco is going back 190 miles into the fastnesses of the Sierras at an estimated cost of \$77,000,000 in order to get its supply from the famous valley of the Hetch Hetchey.

Some 732 western towns and cities, with an aggregate population of 2,265,000, depend on the National Forests for their domestic water supply. This does not include, of course, ranches and small settlements equally dependent on the Forests, nor the towns and cities securing their domestic water from streams and underground supplies which are at some distance from the Forests, but which rise from sources within them. Denver, Colorado; Salt Lake City, Utah; Los Angeles, California, and Portland, Oregon, are conspicuous examples of large cities which are insured a pure

and abundant water supply by the National Forests. So important is this function of the Forests that many communities have entered into co-operative agreements with the Forest Service for the better protection of the watersheds from which they get their supplies.

Perhaps the most obvious relation that exists between forests and water is the tendency of the tree cover to check erosion. The leaves and branches of the trees prevent the rain from beating upon the soil as it does in the open; the cover which they afford delays the melting of snow in the spring; the upper layers of the forest soil act as an enormous sponge that absorbs large quantities of water which in turn are passed on to the great reservoir of mineral soil beneath; and finally, the surface cover of stumps, fallen twigs, branches, and even whole trees acts as a mechanical obstruction to prevent rapid run-off. The

surface run-off from forest areas is less both in total amount and in velocity, than that from similarly situated unforested areas. The steeper and more rug-



THE DESERT BLOOMS

Upper.—With and without—a striking illustration of the transformation worked by the application of water. The dry land outside of the fence on the Minidoka Reclamation Project is a sagebrush desert; that inside, a fertile field of alfalfa.

Lower.—An apple orchard on the Boise Project of the Reclamation Service in Western Idaho on land formerly covered with sagebrush.

ged the topography, the more marked is this contrast.

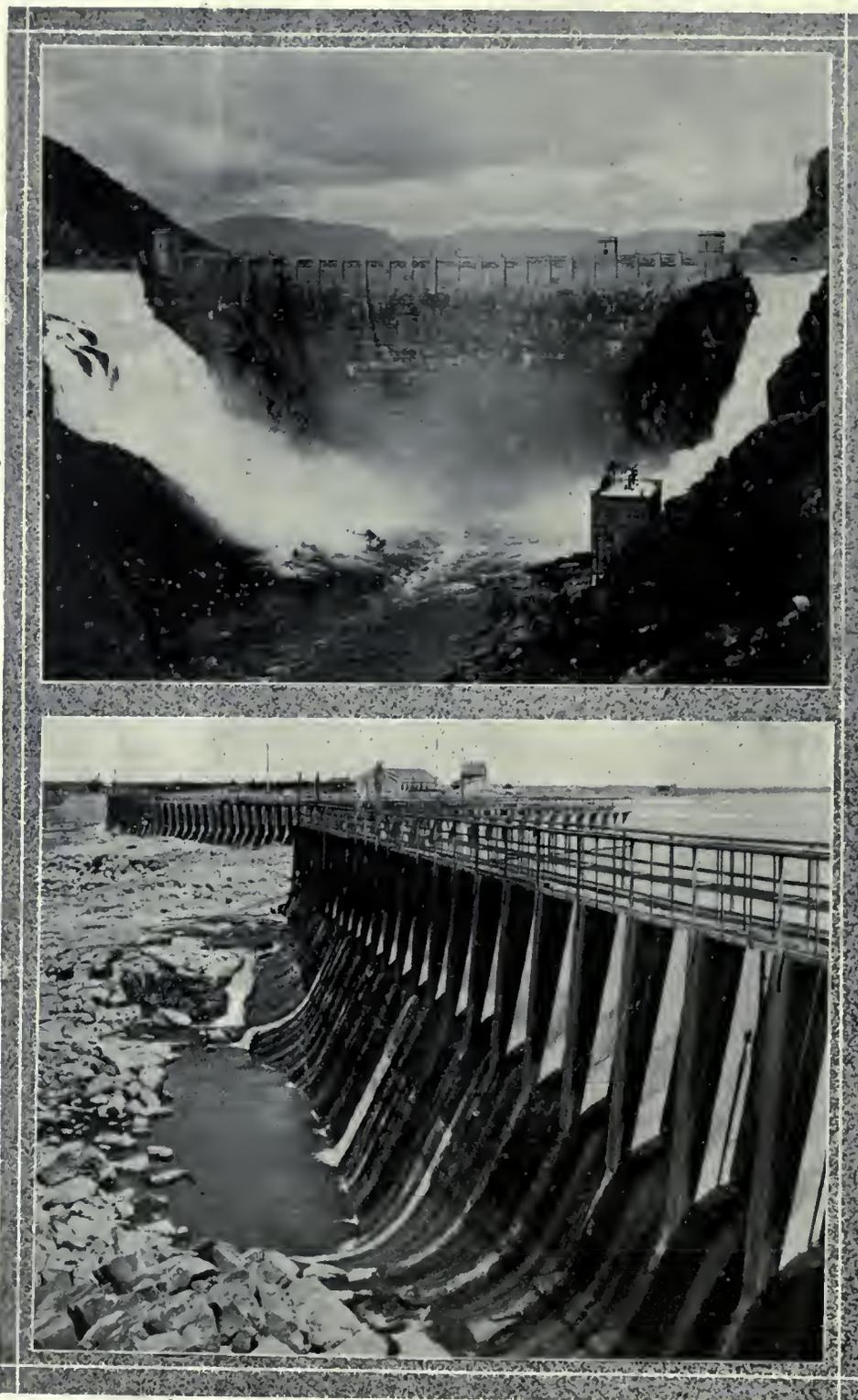
In hilly country some erosion is, of course, inevitable under any conditions. When the soil cover of trees, underbrush, and litter is kept intact, however, this is more often beneficial than otherwise, since only the lighter soil particles are washed away, to be later deposited in the more level lands below, adding to their fertility. But when this protective cover is interfered with, whether by fire, destructive lumbering, overgrazing, or injudicious clearing of land for agriculture, the proportion of coarser, infertile materials washed away increases greatly and transforms erosion from a constructive into a dangerously destructive force, difficult of control and capable of doing untold damage.

From the standpoint of the water user, the tendency of the mountain forests to prevent erosion is of the utmost importance. Wherever storage reservoirs must be used, whether for municipal supplies, irrigation, or water power, they are exposed to the ever-present danger of silting up. Every bit of soil

brought down by the streams and deposited in them reduces their capacity and consequently their effectiveness by just so much. This sedimentation is serious

under any condition, but doubly so when, as not infrequently happens, no other satisfactory dam sites are available and the reservoir can not be replaced at a reasonable cost.

Water heavily laden with eroded material often decreases the efficiency and increases the cost of maintaining diversion dams, pipelines, flumes, canals, and other irrigation works. Sometimes such water damages the crops to which it is applied, and not infrequently it seriously injures or even ruins the land by burying it under a mass of sand, gravel, boulders, and other infertile debris. Excessive erosion may interfere seriously with navigation by filling the streams with material which is deposited in their lower reaches and in



WATER FOR IRRIGATION AND POWER

Upper.—Roosevelt Dam and power plant (in right center foreground). This reservoir stores 1,140,000 acre-feet of water and, together with the Verde River, furnishes the water supply for the Salt River Reclamation Project in southern Arizona. The bulk of the water for the project originates on the Tonto National Forest and the White River Indian Reservation.

Lower.—Minidoka Dam and power plant. This dam supplies water for the irrigation of 120,300 acres on the Minidoka Reclamation Project in southern Idaho. The electricity developed at the power plant is used on many farms for lighting, heating, and cooking.

the harbors into which they empty. The action of the forest in reducing surface run-off tends also to regulate the flow of streams. Instead of rushing away in uncon-

the harbors into which they empty. The action of the forest in reducing surface run-off tends also to regulate the flow of streams. Instead of rushing away in uncon-

rollable torrents the water is absorbed into the great reservoir of mineral soil, from which it is gradually paid out to the springs and streams. This tends to decrease the high water run-off and to increase the low water run-off. Both results are good. The decrease in the high water run-off means that there is less danger of destructive floods and less waste of valuable water; while the increase in low water run-off means that a larger supply of water is available during the dry season, when it is particularly needed. It is the low water flow that to a great extent determines the availability of any given supply for municipal use, irrigation, or hydroelectric development, and anything which will increase this flow is therefore a factor of prime importance.

What One National Forest Does.

A typical example of the ways in which the National Forests benefit the water user is furnished by the Pike National Forest in Colorado. This Forest extends along the main range of the Rocky Mountains from somewhat north of Denver to south of Colorado

Springs, and includes within its boundaries a considerable portion of the headwaters of the South Platte and Arkansas Rivers. Irrigation by means of water coming

from the mountains included in the Pike National Forest had its modest beginnings in 1860 along the South Platte River in South Park and also near Denver. Since then the area on which irrigation is practiced has grown steadily, until now it is estimated at some 400,000 acres, valued at about \$40,000,000 and with an annual crop production of over \$10,000,000. On many acres where water is not available dry farming is practiced, but the results are uncertain and the yields much less than on irrigated land. The value of water in this region is so great that the natural flow of the streams is greatly over-appropriated, and there is need for every additional drop that can be developed or stored. Practically all of the Great



IRRIGATION RESERVOIRS ON THE NATIONAL FORESTS

Upper—Lake Keechelus on the Wenatchee National Forest, Washington, used as one of the storage reservoirs for the Yakima Reclamation Project. When completed, this project will include more than 146,000 acres of irrigated land. The crop production in 1915, on about two-thirds of the area ultimately irrigable, was valued at \$2,400,000.

Center—Granby Lakes on the Battlement National Forest, Colorado. This Forest was created in 1892 at the request of local residents to protect their supply of water for irrigation and domestic use. Within its boundaries are now some 400 reservoirs supplying about 140,000 acres of irrigated land valued at more than \$2,500,000.

Lower—Jackson Lake on the Teton National Forest, Wyoming, with the Teton Mountains in the background. This forms one of the main storage reservoirs for the Minidoka Reclamation Project.

Plains lying east of the Rocky Mountains is potentially agricultural land, and the only limit to its development is the amount of water which can be secured for irriga-

tion. So well recognized is the part played by the forest cover in protecting the water supply that in one case an organization of farmers has protested

reservoir, Lake Cheesman, with a capacity of about 26,000,000,000 gallons and a watershed of 1,152,000 acres, in the heart of the Pike Forest. Colorado Springs has a series of reservoirs which also get their supply from the Pike. Altogether, some 35 cities and towns with an aggregate population of 275,000, and an investment in waterworks of over \$17,600,000, obtain their domestic supply from this Forest. The watersheds supplying Denver, Colorado Springs, Manitou, Cascade, and Idaho Springs are given special protection against fire. At the request of local residents, Congress has added nearly 28,000 acres to the Pike Forest, while farther north, on the Colorado National Forest, Congress in 1916 authorized the addition of some 540,000 acres for the purpose of watershed protection.

Where fire has destroyed the forest cover on certain of the watersheds within the Pike, young trees are being planted. Already some 3,000 acres have been planted by the Forest Service on the watersheds denuded by the great fire of 1866, from which Colorado Springs and its suburbs obtain their water, and plans have been perfected for the reforestation of an additional 9,000 acres.

The development of hydroelectric power bids fair to constitute another important use of the streams which take their rise in the Pike National Forest. It is only in recent years that water in this region has been utilized for power, but the possibilities for development offered by the streams are tremendous.

Placer mining, which, aside from drinking and bathing, probably called for the first use of water on the Pike National Forest, is now practically a thing of the past. The use of water in the milling of ores, however, is quite common in a number of districts, and there are many mills which could not operate without an abundant and constant supply. The value of water as a scenic, or esthetic asset, and its contribution to recreation in the



HOW THE NATIONAL FORESTS PROTECT RIVER SOURCES

Upper.—Willow Creek, one of the sources of the Colorado River, in the Arapaho National Forest, Colorado. The stream comes gently from the belt of forest which stores melting snow from above timber line on the Parkview Peaks.

Lower.—Trapper's Lake, also on the headwaters of the Colorado River, in the White River National Forest, Colorado. The dense stands of timber which are characteristic of such situations help to prevent erosion and irregular run-off.

against any cutting of timber on certain watersheds.

No less important is the use of the water for domestic and municipal purposes. Denver has its main storage

mills which could not operate without an abundant and constant supply. The value of water as a scenic, or esthetic asset, and its contribution to recreation in the

region, should also not be overlooked. To the Pikes Peake region come thousands of visitors every year, attracted by the scenery and climate. Periodically dry streams and eroded stream beds are far from attractive, and in helping to prevent erosion and to maintain a steady stream flow the forest adds materially to the value of the region for the tourist and pleasure seeker.

Some Results of Forest Destruction.

How any interference with the protective cover of trees and other vegetation works to the detriment of the water user is illustrated by the history of a small stream on the Pike Forest known as Trail Creek. This was originally a clear stream confined to a narrow channel and with comparatively little erosion. Gradually, however, the character of the stream changed as a result of heavy cutting on its watershed, prior to the creation of the National Forest and on private lands included within the Forest boundaries, followed by a number of severe forest fires. Floods became more frequent, erosion set in, the stream beds were widened, and their bottoms began to fill up with sand and gravel washed down from above.

In April, 1914, a heavy flood occurred which wrought serious damage to a small ranch at the mouth of the creek. Approximately 11 acres of irrigated land, worth \$40 an acre and including nearly a fourth of the irrigated land on the ranch, were buried under from 18 to 30 inches of coarse gravel and rendered practically worthless. Furthermore, the flood filled up the irrigating ditches so completely and changed the course of Trail Creek so markedly as to make it impossible to continue the use of water from the creek for irrigation without going to considerable expense in the construction of new improvements. In August of the next year a heavy hailstorm resulted in another flood which washed out several acres of hay land along the creek bottom and ruined 16 tons or more of hay worth \$14 a ton. The

same storm also brought down an immense amount of gravel in an ordinary dry gulch running through the farm and piled this 2½ feet deep against the kitchen.



EVERYWHERE THE NATIONAL FORESTS AND THE MOUNTAINS COINCIDE

Upper.—Headwaters of Lewis River in the Rainier National Forest, Washington, with Council Lake in foreground and Mount Adams in background.
 Lower.—Typical view of the Cascade Mountains in the Columbia National Forest, Washington, with Mount St. Helens in background.

door. Altogether, the floods of these two years damaged this one small ranch to the extent of at least \$600 and rendered approximately one-fourth of it practically non-

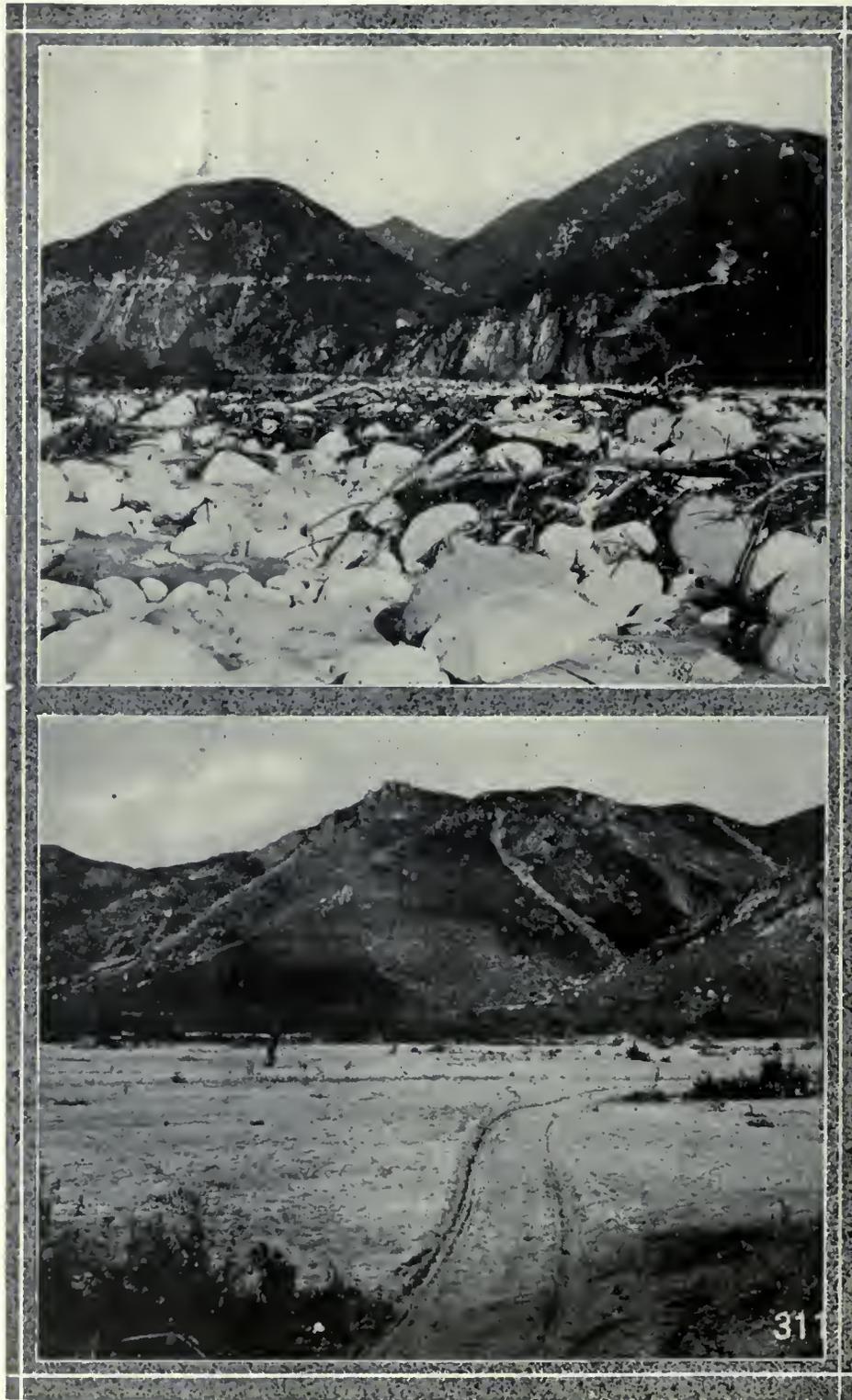
productive. Other examples of the damage resulting from interference with the forest cover before the creation of the National Forests can be selected almost at random from the Mountain Forests of the West. In the Sangre de Cristo Range and the Greenhorn Range, in what is now the San Isabel National Forest, in southern Colorado, it is very noticeable that streams whose headwaters have been denuded to a considerable extent of their protective cover have badly eroded channels and are subject to great extremes in flow, with frequent destructive floods, while no harmful effects of this sort are noticeable on streams whose headwaters are well timbered. Wild Cherry Creek, for example, after being almost completely burnt over, was subject to spring floods and to damage from erosion. During July it would dry up at a distance of not over 2 miles from the mouth of the canyon. As the watershed has become reforested these conditions have changed gradually until today the stream is not subject to floods and erosion and is more regular in its flow.

During the summer it now reaches a point 4 miles below the mouth of the canyon and is used early in the fall for irrigation. Apache Creek, which formerly flowed

the full length of its course all summer, since the destruction of the timber at its headwaters disappears only 2 or 3 miles from its head; and its only value for irrigation purposes after the middle of June lies in its flood waters, which are very uncertain. Hardscrabble and Medano Creeks have suffered similar results, and the list might be extended almost indefinitely.

On the North Fork of the Gunnison River, in western Colorado, much flood damage has occurred as a result of the extensive fires which burned over its upper watersheds in the late seventies and early eighties. Previous to that time the creek channels were narrow and rocky, beavers were abundant, and the bottom lands showed little erosion.

In 1884 a heavy snowfall was followed by a flood which is estimated to have ruined at least 2,000 acres of good ranch land. Since then destructive floods have occurred every



WHAT TOO RAPID RUN-OFF CAN DO

Upper.—Boulders for soil. This view of the Santa Ana River in southern California shows how torrential run-off may wash away the soil and leave the land covered with snags, gravel, boulders, and other infertile debris.

Lower.—Sand for alfalfa. The sand waste in the foreground is typical of hundreds of acres of formerly good alfalfa land along the San Diego River in southern California which were seriously damaged by the flood of January, 1916.

few years. In 1912 irrigated land and other property was damaged to the extent of some \$20,000, a \$5,000 bridge was washed out, and \$8,000 was expended in preventing the destruction of two other bridges. In spite of this comparatively recent damage it is generally believed that floods are becoming less frequent and less destructive as adequate fire protection on the Gunnison Forest is gradually restoring a forest cover on the burned-over areas.

Thirty years ago a big fire burned over the watershed of Gypsum Creek, which is located in central Colorado in what is now the Holy Cross National Forest. Two years after this fire the low water flow of the creek was so reduced that the use of water for irrigation from it was restricted to the first 47 degrees. Since then the flow had gradually increased with the establishment of a dense stand of timber until now it furnishes sufficient water for 130 degrees.

The following letter from a rancher in northern Wyoming throws light on what the protection afforded by the Bighorn Forest means to the water user in that part of the country: "I

have resided on Rock Creek for 28 years. During all this time I was owner of a ranch and was dependent on a good supply of water for all my crops; the welfare of my stock and my own financial standing depended, therefore, more or less, on a good flow of water in Rock Creek. All these reasons make a man observant and thoughtful about any causes that may prevent a normal flow of water in any stream the headwaters of which are in the mountains. We all know that if a forest fire runs through the biggest portion of the watershed of a stream the water supply of such a stream is greatly diminished, if not entirely cut off, during the latter part of July and August, and untold damage is done to all ranchmen who are dependent on such a burned-off area for their irrigation water.

"As proof of the foregoing, I mention the great fire on the headwaters of Rock Creek



THE FIRE MENACE

Upper.—Vista Point, on the Santa Fe National Forest, at the headwaters of the Pecos River. Dense stands of timber are typical of the higher elevations, where fire has been kept out, and form an ideal cover for the watersheds.

Lower.—View on the Rainier National Forest, Washington, along Stabler Ridge and Niggerhead. Where fires have burned we have denuded slopes like this, which are a menace to the lands below because of the danger of erosion and floods.

in 1890, when four-fifths of the Rock Creek watershed was burned off. There was good reason to think it was incendiarism. Immediately after the fire and for eight

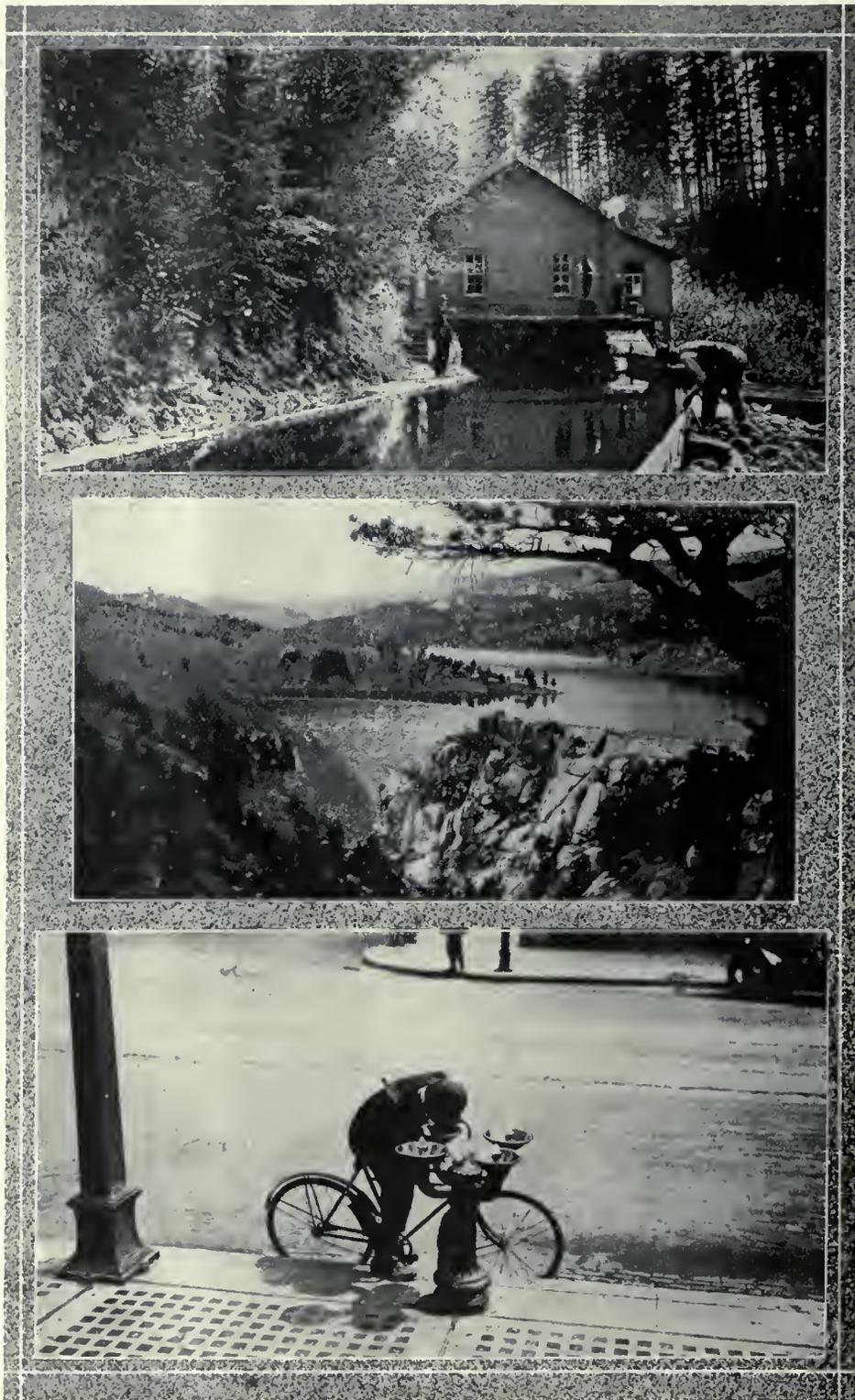
years afterwards there was very little water at the right time. There were some destructive floods too early in the season to do the irrigator much good. But as the hills became covered with young reproduction the flow of Rock Creek kept increasing and the floods became less destructive, and today, 20 years after the fire, Rock Creek is nearly normal again, but not quite, for the reason that in the head of the main fork the fire was so destructive that there were no seed trees left for a distance of nearly 5 miles on the south side of the creek, and consequently the reproduction is very scattering.

"In conclusion I wish to state that anyone who successfully farms a ranch in this part of Wyoming understands the great importance of keeping the forest fires out of the mountains and of maintaining a good stand of timber on the watersheds of all streams to hold the snow and help prevent the rapid run-off of the water too early in the season to be of much use to the irrigator."

Many examples of destructive floods caused by over-

grazing in the mountains prior to the creation of the National Forests are furnished by the State of Utah. In what is now the Fillmore National Forest the Chalk

Creek, Pine Creek, Meadow Creek, Fool Creek, Oak Creek, and Scipio watersheds, which supply the water for 27,000 acres of irrigated land and for the towns of Fillmore, Meadow, Oak City, and Scipio, were at one time so heavily overgrazed that the resulting floods damaged roads, reservoirs, cultivated land, and other property to the extent of thousands of dollars. Since the creation of the National Forest grazing on these watersheds has been prohibited or restricted, and the vegetative cover has had a chance to re-establish itself. As a result, the floods have been steadily decreasing, both in number and severity, until they are now practically negligible. The importance of the protection exercised by this Forest is still further



PROTECTION OF DOMESTIC WATER SUPPLIES

Upper.—Intake of the water system for the city of Portland, Oregon. Water for the city comes from the Bull Run Watershed, entirely within and protected by the Oregon National Forest.
Center.—Lake Cheesman, in the heart of the Pike National Forest, Colorado—the main reservoir for the water supply system for the city of Denver.
Lower.—A street drinking fountain in Portland, Oregon. The purity and abundance of the water is assured by the fact that it comes directly from the Oregon National Forest.

emphasized by the fact that, together with the Fishlake and Sevier National Forests, it is the source of water used in the irrigation of some 200,000 acres, valued at

over \$18,000,000, and as the domestic supply for some 28 towns, with a total population of about 13,000. *How National Forest Administration Benefits the Water User.*

In the actual management of the National Forests every precaution is taken to see that the interests of the water user are fully protected. No utilization of their various resources is permitted unless a negative answer can be given to the question, Will the proposed use have any injurious effect on the water supply?

An outstanding feature of National Forest administration is the emphasis placed on fire protection. Fire is the worst thing that can happen in a forest, both as regards destruction of property and interference with the water supply. Every fire, no matter how small, destroys some of the organic material in the surface layers of the soil, and to that extent reduces its absorptive capacity. Repeated fires on the same area, even if they do not destroy the forest outright, may practically nullify its effects in preventing erosion and regulating stream flow. Every effort is made

to control so dangerous a menace. The guiding idea is to prevent fires from starting and to put out those that do start before they attain any considerable head-

way. Various means are used to bring home to the general public the seriousness of the fire danger and to secure the cooperation both of local residents and transient visitors. Lookout stations are established on mountain tops and at other points of vantage for the prompt detection of fires. These are supplemented by riding patrols. Boxes of fire-fighting tools are placed at strategic points. Roads, trails, and telephone lines are built as means of quick communication. Extra men to serve as fire guards are appointed during the danger season, and the local community is so organized as to make an efficient fire-fighting force available on short notice.

The system has now reached a stage of efficiency where the majority of fires are brought under control before they do any serious damage. In 1916, for example, 73 per cent of the 5,655 fires on the National Forests were extinguished before they had



FIRE PROTECTION ON THE NATIONAL FORESTS

Upper.—A fire-lookout station on the summit of Mount Eddy, on the Shasta National Forest, California. Lookout stations of this sort make possible the prompt detection of forest fires. They are connected by telephone with the headquarters of the Forest Supervisor, who is thus enabled to organize and dispatch a fire-fighting crew before the fire gains any considerable headway.
Lower.—Extinguishing a fire on the Wasatch National Forest, Utah. In the mountains of the West axes and shovels play a much more important part than water in the suppression of forest fires.



PLANTING TREES ON DENUED LANDS

Transplant beds at the Cottonwood Nursery on the Wasatch National Forest in Utah. About 10,000,000 forest tree seedlings and transplants are grown by the Forest Service each year for use in the reforestation of denuded lands on the National Forests.

burned over 10 acres, and only 4.4 per cent caused a damage of more than \$100. The chief opportunities for further progress lie in reducing the number of fires that occur, and in this work every citizen can help. The water user in particular should be among the very first to cooperate in keeping down fires. His prosperity is intimately bound up with their suppression.

Necessary precautions are likewise taken to keep in check insects and diseases which would endanger the forest cover on watersheds in the National Forests.

When the boundaries of the National Forests were first drawn it was inevitable that occasional areas of land more suitable for farming than for timber production or watershed protection should have been included. To make certain that all of the lands within the National Forests will be put to their best use thorough surveys were made by experts, as a result of which the lands have been classified according to their primary value for timber production, watershed protection, agriculture, and the like. In making this classification, one fundamental prin-

ciple was followed, namely, that land chiefly valuable for the prevention of erosion or the regulation of stream flow should be retained in the National Forests and administered primarily for these purposes. Such other lands as appear to be more valuable for crop production have either been eliminated altogether from the National Forests or else opened to entry under the Forest Homestead Act. It sometimes happened that areas were encountered which were of value both for farming and for watershed protection. When this was the case it became necessary to determine their relative value for the two purposes. The fact that throughout the West water is such a precious commodity ordinarily led to the classification of such tracts as primarily valuable for watershed protection. A good example of the way in



TREE PLANTING ON THE PIKE NATIONAL FOREST, COLORADO

This is the watershed from which Colorado Springs derives its domestic water supply. About 10,000 acres are reforested each year by the Forest Service, mainly on watersheds from which towns and cities and irrigation projects derive their water supply.

which this works out in actual practice is afforded by the Angeles National Forest in southern California, which is the main source of the water supply for millions of dollars' worth of citrus groves and other irrigated lands in the valleys below. These lands, which owe their high

productiveness entirely to irrigation, are many times more valuable than the rather mediocre lands within the National Forest, even when the latter can be cultivated successfully.

Consequently, all of the land within this National Forest, much of which is easily eroded, has been classified as primarily valuable for watershed protection wherever there was any danger that its cultivation might cause erosion or changes in stream flow that would result in damage to the irrigated lands below.

The same principle also applies in the case of lands primarily valuable for municipal supply or for hydroelectric projects. Out of the 12,000,000 acres in the Western States that have been eliminated from the National Forests or opened to entry in the last five years, practically none are primarily valuable for watershed protection. The water user and his needs have been given first

consideration. Within the National Forests is a large part of the western summer stock range. Before the creation of the Forests, this range had been so badly

trampled and so heavily over-grazed that its carrying capacity had been seriously decreased, and, what was worse from the standpoint of the water user, the protec-

tive influence of the surface cover of grass, shrubs, and small trees had been largely destroyed. In many localities over-grazing had been the cause of severe erosion, disastrous floods, and reduced stream flow during the dry season.

Grazing in the National Forests has been regulated in such a way as to repair such damage to the fullest possible extent and to prevent similar damage on areas not already affected. Not only has grazing been restricted in certain localities, but new methods of handling the stock have been introduced. In the case of sheep, for example, the old method of grazing them in large, compact bodies and bringing them back night after night to the same bedding ground, which proved so in-

jurious to both forage and soil, has been replaced by handling them in smaller, more open bands and by bedding them down wherever night overtakes them. Cattle



REGULATED GRAZING ON THE NATIONAL FORESTS

Upper—Sheep grazing on the Santa Fe National Forest, New Mexico. Approximately 7,500,000 sheep use the National Forest range each year. Damage to the vegetative cover is prevented by limiting the number of stock to the carrying capacity of the range and by proper methods of handling, such as open herding, illustrated in the picture.

Lower.—Cattle grazing on the Santa Fe National Forest, New Mexico. Approximately 2,000,000 cattle and horses use the National Forest Range each year. Full utilization of the range is secured by the proper development of water holes and salting grounds.

are prevented from congregating too much by a proper distribution of salt and the development of watering places at the higher elevations and on the less frequented parts of the range. All stock is kept off of the range until the ground is firm enough not to be cut up by trampling. Where necessary, no grazing is allowed until the grass and other herbs have had a chance to seed. By such measures as these the water user is protected, and at the same time the grazing industry is benefited. Under the improved methods the range is, in fact, being built up to a point where it can carry larger numbers of stock than before and still afford protection from the twin dangers of erosion and irregular stream flow.

In cutting timber on the National Forests, similar precautions are taken to see that the interests of the water user are properly protected. Destructive lum-

bering, which too often stripped the land and abandoned it to fire, with entire disregard not only of the future timber supply, but also of the water supply, is now a

thing of the past, so far as the National Forests are concerned. In its place has been substituted a system of management which assures the preservation of the forest

cover and of its protective influence. At the higher elevations, where because of thin soil, steep slopes, and heavy precipitation the preservation of a fairly dense forest cover is particularly important, "protection forests" may be set aside in which little or no cutting is allowed. At lower elevations the amount of cutting that may safely be allowed naturally varies more or less with local conditions. In each case a careful study of the situation is made, and the timber is never thinned below the point of safety. Lumbering is carried on with the primary object of improving the forest and keeping it continuously productive. So far as possible, new growth is secured by natural reproduction from the



ONE METHOD OF STREAM CONTROL

A costly substitute for brush and forest cover. These check dams are part of a series of approximately 400 dams constructed in Haines Canyon, on the Angeles National Forest in Southern California, at a cost of some \$6,000,000, in order to control the floods resulting from the complete burning off of the protective brush cover.

old trees left standing. Areas burned over before the creation of the National Forests need to be planted to trees and many difficulties are encountered in this work.

TRAVELS OF AN ENGLISH CHRISTMAS TREE

BY CLARA L. WEST

IT was the day before Christmas in England—in the south of England, where the belated roses lingered here and there in the gardens, and the snow melted as soon as it fell.

The family at the Hall, an old country seat, decided that it was time to bring in the tree. Now the trees on an English estate are considered very valuable. The "lop and the crop" of the trees are used for kindling, that is; the cuttings made by the woodmen, and the small branches which fall of themselves. But to cut down a tree—that is a matter requiring the greatest consideration. So, it was quite an event to go into the woodlands, with the Lord of the Manor, who had the right to cut down, or dig up, any tree he pleased.

The Squire, the guests, the children of the whole place, even some of the house servants, went with the gardener and the woodmen in search of the Christmas tree.

It was a fit tree they wanted—not too large, nor too small. When they came to a fine strong tree, they stopped, and all made a circle around it.

"Shall you chop it down now?" asked the American, one of the guests.

"Chop it down!" exclaimed the Lord of the Manor.

"Chop it down!" echoed the gardener, in great surprise.

"Chop it down!" cried the children.

They were all thinking of it as a live greenwood tree—but the American only thought of it as a framework to be dressed as a Christmas tree.

"No—we shall dig it up," said the squire;

"Yes—dig it up"—agreed the gardener;

"Dig it up"—repeated the children.

While the American wondered what difference that would make. But, that was all the difference in the world, as you shall see, for it saved the life of the tree.

The gardener measured the earth from the trunk of the tree to the circumference of a circle around it, staking it off with bits of wood, working just as if he were going to transplant it. Then the woodmen dug it up, roots and earth, and planted it in a great tub, like a washtub, which really looked like a giant's flowerpot. After that the tree was hoisted into the cart driven out of the forest, across the park, to the house. There they placed the noble fir tree in the middle of the great entrance hall. And this was the tree's first journey into a world outside of the green-wood.

The Yule log was already in the great fireplace, ready to be lighted. Holly and mistletoe boughs garlanded the chimney-piece and the old portraits in the Hall. And on the wainscoting of the walls there were curiously carved panels, representing scenes from English history, and old customs. One of them was about the "Making of Pinnes." It represented a man

kneeling before Queen Elizabeth, with many quaint round-headed pins stuck in a cushion. The Queen looked in surprise at these wonderful things. Underneath was carved in old English letters:

"How ye makyng of pinnes was firste done in a righteous and discreet manner in Gloster Citee. For ungodlie men, seekyng only their present gain, fixed ye head without steadfastnesse, and fools, of their folie, made ye point with dust of Qud (?) that left it malign unto them that were wounded withal!

"Whereupon Elizabeth, our Queen, gave right of patent unto John Tilsby, our citizen, who avouched and shewed proofs that he made espingles (pins) with truth and knowingnesse."

And so, it was this John Tilsby who was kneeling before the Queen showing her his good Gloucestershire pins. But no one paid much attention to the treasures in this old house—the carvings, portraits, and the wonderful porcelain collections, because the tree was waiting to be dressed. It was a real live tree, remember, with its good roots still feeding it.

Before dark the family came with hammers and tacks, and green branches, and they covered the tub, with evergreens and holly, until not an inch of the wood could be seen. After that, the red apples and oranges were tied on, to properly weight the branches—then the gilded and silvered walnuts, and many colored shining balls, paper butterflies, gold and silver birds and fishes, bon-bons, and Christmas boxes of candies (which they call "sweets" in England), and mysterious small packages for special people, tied up in gay papers. Then much glittering tinsel thread, called "Angels Hair," and paper posies. Then they put on some little glass bells, which made a cheerful tinkling sound whenever the tree was shaken. But no popcorn, because there is none in England, and no strings of red cranberries, for the same reason. The wax tapers were then put in place, red, blue, green, yellow, white and pink. And to crown it all, at the very top, they placed a big, dazzling, gold star, with many candles around it so that its shining could be plainly seen. All the large presents for the household were placed under the tree on the earth, covered with green. It was done! How fine it looked!

There the tree stood all night long, until the dawn. Very early the chimes of the village church began to ring in the Christmas morn. On and on they rang, for there were eight bells in the parish church tower, and it took nearly two hours to ring in all the changes.

The tree heard all this!

Presently a footman brought in a red bench—and placed it on one side of the hall. Then another, and another and another. They were red-cushioned benches and looked very gay. Then the man looked at the

clock, and went away to strike a gong. After the gong stopped sounding, there was a silence—a great stillness, in the house, for a time. Then the patter, patter, patter of footsteps coming down the great stairway announced the arrival of the family and their guests. "Merry Christmas" was heard on all sides. The master of the house pulled a bell, and the procession of house servants entered, headed by the housekeeper and butler, and took their places on the red benches. The family and friends were in groups near the fireplace and in the window niches. The lesson for the day was read, and the Christmas prayer said. And the Tree, in all its glory stood in the very middle of everything. Surely it had never been in such company before. And, afterwards when, amid much merry-making, the presents were given and taken, the tree had to part with some of its fine trimmings, while the little glass bells tinkled joyfully as each package was pulled off.

But hark! There were singers just outside the door:—

"Come fill the house with song and glee
With mistletoe and holly tree
For Christmastide is here."

There they stood, the children of the estate, with their fresh young faces, all dressed in their holiday clothes, singing the Christmas carol. When they had finished, they were called into the house, and each given a Christmas box.

The tree saw wonderful things that day: the carol singers, the bell-ringers, the finely dressed guests for the great dinner, the crackling Yule log, and all the fine presents spread around the hall.

The travels of the tree went on after Christmas day, for, the next morning many of the decorations were taken off, but not the glittering tinsel, the paper roses nor the great star. The cart came to the door, and took the tree down to the village school house. What a fine ride through the frosty air! The school children were to have a treat and the tree was again dressed. This time with many bags of candy and toys. All were tied so that the children could see them and talk about them. More wax candles—and some big round cakes with a hole in them through which the string to hang them on was tied. The children had a fine feast and a magic lantern show—then they sang a carol, and marched out passing the tree, each child getting a toy and a bag of candy and a cake. So, at the end of this evening the tree stood quite bare except for the tinsel, the paper posies, and the star.

One more journey the tree was to make before it re-

turned to its home in the forest, for it was going back to be planted again, and go on growing.

This last journey was to a hospital, in the Cathedral town. Once more the cart arrived and carried off the tree; and, as it rolled down the quaint old street, some children shouted "Ha! Look at the star—there goes a Christmas tree a-riding!" Again the traveling tree had to be dressed, and this time in a room where all the people were in little white beds trying to rejoice because it was Christmastide, although many were ill and sorrowful. The star shone out in all its splendor, and the fir-tree with its new decorations, stood up straight and strong, because its roots were firmly planted, and there was earth to nourish them. Nobody was afraid that the tree would fall over—it was not possible, with such a foundation, and besides it was alive!

Even Christmas festivals come to an end, and so, one morning the tree was made ready for its last ride in the cart. Then the glittering star came off, and the tinsel, and even the paper posies.

The children of the old estate eagerly watched the country road for the return of the tree. When it entered the park, the children, indeed everyone in the house, rushed down to meet it and go with it into the woods. And one of the children said. "Let us hang one of our glass bells on the tree and then it will tinkle when the wind blows." And so they did.

The gardener and the woodmen took the tree back to the very place from which they dug it up. There was the great yawning hole, and when the woodmen knocked off the staves of the tub, the tree was planted back into its old home, ready to go on growing when its roots should strike out again into the earth.

It was a proud tree, for it was not only a fir tree, but a Christmas tree, and a traveled tree; which had seen the life of creatures outside of the greenwood. When the wind arose the little Christmas bell tinkled as if to wish good cheer to all the birds of the woodland.

The children of the old place delighted to walk in the woods for they knew several trees which, from time to time, had been their Christmas trees in the Hall. Sometimes they would stop and exclaim "Look at this date," showing the metal tag with the date of the journey of the tree out of the forest.

And all this shows that it is better to have one live tree for three festivals, than to cut down, and kill, three trees for the same purpose.

This is a true story, and happens each year in a place in Southern England.

STATE FLOWERS OF MARYLAND AND WEST VIRGINIA

THE American Forestry Association has received a letter from Mrs. T. R. Payne, of Baltimore, Maryland, in which she says: "It gives the Halten Garden Club, of Baltimore County, great pleasure to announce that Maryland has a legalized state flower, the Black Eyed Susan (*Rudbeckia-hirta*). We thank you for your assistance in the matter and hope you will add

our state to your official list." And another from Mayo Tolmon, chief engineer, who says: In an article in the *Boston Transcript* I noticed you gave the state flower of West Virginia as the Indian Paint Brush. The state flower of West Virginia is the Rhododendron. It was chosen by the children of the state and legalized by joint resolution of the legislature.

FOREIGN STUDENTS OF FORESTRY IN AMERICA

STUDENTS from Sweden and the Philippines, both for advanced work, and other students from China and Canada have been sent to the United States to secure training in forestry, marking an advanced step in the international application of the principles of reforestation of barren areas, and the beginning of cooperative studies along reforestation lines between various nations. This acceleration of the training of men in the great out of



FORESTRY MEN FROM FOREIGN SHORES AT SYRACUSE

Reading from left to right: F. B. Mann, Lindsay, Ontario; A. E. F. Schard, Stockholm, Sweden; H. J. MacAloney, Halifax, N. S.; Mark Y. C. Hwang, Kiukiang, China; Chia Choung Tong, Tien Tsin, China and Luis J. Reyes, Manila, Philippine Islands.

doors profession is the direct result of the war, which caused a realization of the need of the world for trees and timber. Six foreign students are registered this year at the New York State College of Forestry at Syracuse, four in undergraduate work, and two in advanced study, in addition to a larger entering class than has ever before been known in the New York institution. The foreign students come with an unusual record, particularly in two instances, where they are sent by authorization of foreign governments for advanced study. The six foreign students of the New York State College of Forestry at Syracuse are: A. E. S. Schard, Swedish Royal Forest Service, American Scandinavian Foundation exchange fellow from Stockholm, in interchange with Henry M. Meloney, of the New York College, sent to Sweden by the Foundation. Luis J. Reyes, assistant Wood expert of the Philippine Forest Service, graduate of the Insular Forest School of the University of the Philippines, and for the last six years with the Philippine Forest Service. Mark Y. C. Hwang, Kiukiang, China, member of the junior class, sent here through authorization of the Chinese government, to learn how to assist in the reforestation of China. Chia Choung Tong, Tientsin, China, a freshman here for study under the same conditions as Mr. Hwang. F. B. Mann, Lindsay, Ontario, member of the freshman class, in America to study for future practical work in the Dominion.

NATURE IN THE NUDE

THE frosts, the rains and the boisterous blasts have stripped the trees of their green robes of summer and they stand naked—but unashamed.

The leafy tent which the big maple made in your doorway last June is now but a tracery of twigs against the sky. Its delicate fret-work is for the most part as rigid and motionless as if stamped from steel, for it no longer invites the vagrant zephyrs for a romp, and even the northern gale drives through its skeletonized body with almost as little resistance as a ghost would offer.

Yet it is still beautiful. We can now study the great limbs of which there was no hint beneath its summer drapery; the huge, swelling muscles where the limb joins the trunk, the point of greatest strain. Note, too, in the case of the forest maple, the perfect balancing of weight, which is the secret of the straight, columnar bole.

Observe how the oak throws out great, brawny, horizontal branches which suddenly turn and lift skyward, with an abrupt taper, in order that the multitudinous leaves of the growing season may receive their share of sunlight. The branches of the elm, on the other hand, shoot upward first and then turn their tips outward and downward, like a waterfall. But the same end is secured.

If you learn the trees in the spring and summer, with leaf, flower and fruit as your guides, you must learn them all over again in the winter. It is a bit baffling at first, for most botanical manuals seem to assume that trees are to be studied only when in verdure. But it's all the more fun for that.

Now the only clues in your arboreal detective work are the bark, both as to texture and color; the habit of branching; the twigs, by their alternative or opposite position; the leaf scars and the shape, size and color of the buds, which some people may be surprised to learn are all finished before the first frost.

But soon you come to recognize a tree just as you do a friend—instinctively, as it were, with no cognizance of details. The contour is sufficient, and you may in time rival James Russell Lowell, who implies in one of his poems that the etching against a moonlit sky enabled him to name any New England tree.

And it is true that trees look more alike in summer than in winter. In their winter nakedness nothing is concealed; their individuality is blazoned to the discerning eye. The infinite variety of nature in accomplishing the same end is revealed.

Trees, then, become more than trees to us. They become living entities, and we begin to imbue them with the aspirations and sentiments which we ourselves cherish. We begin to understand why John Muir was charged with thinking more of a tree than of a man, and we can enter into the spirit of John Burrough's reputed retort: "Well, why shouldn't he?"—(Reprinted by courtesy of the *Chicago Evening Post*.)

A CHRISTMAS WALK WITH BIRDS AND BEASTS

BY A. A. ALLEN, PH. D.

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

IT WAS Molly Cottontail that started us off. Her clean-cut tracks across the yard and up the hill toward the edge of the woods invited us to follow and learn her story of the night before. There had been a light fall of snow the previous day and the night had been quiet with a bright moon inviting all of the wood folk to come out for a frolic. Every action was recorded by the tell-tale prints of their feet in the snow and all

rels and mice the front feet usually strike side by side like the hind feet. When Bunny reached the hill her pace slowed up and her tracks were much closer together. We could see where she had stopped for a moment to look around for there were two little marks of her front feet in front of those of her hind feet. She did not rest, however, for there was no mark of her body in the snow. She probably realized she was too conspicuous in the moonlight against the glistening snow to stop long, for on she went to the berry patch just over the top of the hill. Here she delayed for some time nibbling the tender shoots. Several times she had hopped away from the patch for several rods only to return again. We thought she might still be hiding somewhere in the thicket but when we counted the number of tracks going in and coming out there were as many leaving as entering, so we knew she must have gone on. A wider circle about the patch showed us a clean cut trail leading toward a brush pile at some distance and there the



THE TRAIL OF MOLLY COTTONTAIL

This record tells us that she was traveling slowly and stopped twice to look around.

previous records that ordinarily would have confused the story had been erased.

What a day for a tramp it was; cold but quiet, and the crisp air sent the blood coursing through our veins and brought the color to our cheeks. Up the hill we went following the route that Bunny had taken. She had crossed the yard at a pretty good pace; we could tell because her tracks were far apart and the prints made by her front feet were far back of those made by her hind feet. When a rabbit hops, its front feet strike first, usually one in front of the other, but the momentum of its body carries its hind feet further forward than the front ones and they strike side by side. Indeed this is true of all hopping animals whose hind legs are longer than their front legs, and it is true of other animals as well, when they gallop. With squir-



WHERE BUNNY STOPPED TO LOOK AROUND

The pair of circular marks in the center of the photograph were made by the rabbits front feet when she stopped for a moment between jumps.

trail ended. Now for the fun. The first jump on the brush pile gave no response but with the second, there was a slight crackling of the sticks in the far corner and, the same instant, a little ball of brown fur surmounted by the sauciest, fluffiest white tail went bouncing across the snow toward a not distant woodchuck hole. Here Molly Cottontail had had occasion to take refuge

before and no doubt the blessed haven was well fixed in her rabbit memory though it was now almost concealed by snow.

The woodchuck hole was on the edge of the woods and near it was an old oak that we knew to be the home of a frolicsome family of red squirrels. How busy they had been storing acorns last fall and scolding the blue jays and the redheaded woodpecker that competed with them for the fruits of the great tree, but this morning all was quiet. We were about to believe that they were not yet up when we noticed the numerous trails leading



A HUNGRY RED SQUIRREL

Squirrel tracks resemble small rabbit tracks but the front feet always strike side by side.

from the base of the tree in all directions and we knew that we were the laggards. The tracks looked something like small rabbit tracks but the marks of the front feet were always side by side no matter how fast the little animal was traveling. Most of the tracks led out from the base of the tree for a couple of rods to small holes in the snow where the squirrel had dug down for acorns and then they proceeded back to the tree again where he could eat in safety. We wondered how he could remember where each nut was when the ground was covered with snow for he never seemed to make a mistake. Every track was full of purpose, going directly to the spot where the treasures were hidden.

Not so business-like were the tracks of the little deer mouse coming from a nearby stump. Perhaps he had all his stores for the winter hidden in the roots of the stump and came out just for exercise, for though we followed his tracks all about the corner of the woods, we could not discover his particular errand. We knew it was a deer mouse that lived in the stump because of the long hops and the marks made by his long tail in the snow. Occasionally when climbing a hill he apparently held his tail up from the snow so that his tracks looked very much like his cousin's, the meadow mouse, but as soon as he

started down the other side, the long slits in the snow announced his identity. The only other long-tailed mouse that lived in the vicinity, the meadow jumping mouse, we knew was safely tucked away in a snug little nest for his winter sleep. There were other deer mice living in this woodland and all had apparently been out the night before passing and re-passing each other so that their trails often made a network of tracks. Sometimes they led up to the base of a tree and did not return so we knew the little mouse had climbed the tree like a squirrel for sheer fun and finally had scrambled down a grape vine that hung from one of its branches. One deer mouse track led up to a bush containing a song sparrow's nest that had been roofed over with shreds of bark and grasses, and when we touched it, a tiny yellow-brown head with two big black eyes and two big ears popped out of a hole in the side as if to say, "Hello, who's there?" Then, terrified by the size of her callers, she leaped to the ground and disappeared under a log.

Here and there in the woodland we found shallow furrows in the snow leading into burrows that ran just beneath the surface and then out into furrows again as though the little animal that made them did not know or did not care whether he ran on the surface or burrowed



MAKING TRACKS

This shows how the tracks of the cottontail are formed: the front feet, one behind the other and both behind the larger hind feet that strike side by side.

beneath it. This we knew to be the trail of a short-tailed shrew whose tiny eyes can probably scarcely tell day from night. He is about the size of a small mouse but his fur is short and dense and gray like a mole's and his nose is very pointed. Unlike the mole, however, his front feet are not enlarged and the footprints that he leaves in the bottom of the furrow as he patters along are small and equally far apart. In spite of his small size and apparent blindness, however, he is a wicked little beast for he follows the deer mice and meadow mice into their burrows where he corners them and mercilessly kills them with his needle-like teeth. Such an appetite has he that he seems to have no difficulty in disposing of an entire mouse much larger than himself for he leaves only the



COMING AND GOING

The trail of a deer mouse in soft snow. The separate marks of front and hind feet cannot be distinguished but the mark of the long tail behind each track is clearly defined. Which way did he go?

skin turned neatly inside out. He seems equally at home in the woods and the fields and on this day we found his trails almost as frequent as the tracks of the mice, perhaps because the mice do a good deal of their running on the surface of the ground beneath the snow.

Especially is this true of the fat little meadow mice that seem to have difficulty in jumping in the soft snow and prefer to burrow through it. In places where the snow was hard, however, their tracks were plentiful enough,



THE DEER MOUSE

His large eyes, big ears, rich yellow-brown upper parts and snowy white underparts make him a most attractive little beast. He is also called the white-footed mouse.

looking like miniature squirrel tracks, the short tail only occasionally striking so as to leave a mark. So many enemies have the meadow mice that it is little wonder that they scarcely dare show themselves above the snow. The hawks by day, and the owls, racoons, weasels, skunks, foxes and cats by night combine to keep him ever on the alert. At this particular time, however, he had little to fear from coons or skunks, for the weather had been cold for weeks and they were snugly asleep enjoying their partial hibernation and waiting for a few warm days and nights to awaken them.

We noted, however, that the weasels were out for we followed the paired tracks of one back and forth along the edge of the woods, observing how it had loped over the surface and burrowed beneath by turns. Never a brush heap or a stone pile was passed by the inquisitive beast without a thorough exploration of all its nooks and crannies for some shivering mouselet. We knew that he was not entirely nocturnal in his explorations and as the tracks were still fresh we kept our eyes ahead for the slightest motion. During the winter the weasel's



HAS MANY ENEMIES

The hawks by day and the owls, cats, weasels, foxes, racoons and skunks by night combine to keep the little meadow mouse ever on the alert.

coat is pure white except for the black tip to its tail and one has to look closely to see this or his beady black eyes and muzzle when everything is white. At last the tracks led to a pile of logs and did not lead away so we knew that he was somewhere beneath. Instead of turning over the logs to hunt for him we sat down near one end of the pile knowing that if his natural inquisitiveness did not bring him out, a few "squeaks" would. Somewhere in the distance a flock of crows were mobbing a sleepy owl and a couple of blue jays screeched their displeasure over the presence of a squirrel in their favorite tree. But close at hand all was silent save for the lisping peeps of a few chickadees hunting about the tips of the hemlock branches. We had not long to wait. A feeling gradually came over us that we were being watched and sure enough, a slight movement of something drew our atten-

tion to two shining black shoe buttons in a crevice and a tiny black muzzle which quivered slightly as though it did not like the smell that was being wafted in its direction. The animal, itself, we could scarcely distinguish from the snow all about it. When the eyes suddenly disappeared, considerable of the snow disappeared with them and we knew that we had seen more of his lordship than we realized. Not a sound did we hear in the log pile but suddenly in an entirely different place we perceived the shining eyes once more gazing intently at us. Several times he appeared and disappeared as though he were playing a little game with us, so we thought we would respond. I put my hand to my lips and gave the "young bird squeak" that is so successful in drawing birds during the nesting season. In an instant his entire attitude changed. Out popped his whole



A MEADOW MOUSE SPEEDWAY

When he ventures into the open, the meadow mouse is exposed to many enemies and must put on the high gears. He lost no time in crossing and recrossing this open stretch.

serpent-like head and shoulders, his head turning first one way and then the other and his little muzzle sniffing the air to detect the whereabouts of the breakfast that his ears had just heard. Back into the logs he went and then out of another crack much nearer. He was all attention and his little muscles seemed to quiver with excitement but his offended nostrils told him that there was nothing near but his huge and dreaded enemies, and, after a few more passes, he disappeared.

Our path now led us to the creek which was frozen over except in the swiftest places. Out from one of these led some broad pigeon-toed tracks with an uninterrupted clean cut furrow following between them that we knew could have been made by none other than "Major Muskrat." Where the snow was a little deeper his body made a broad furrow and always his heavy flattened tail cut down into the crust behind him. He apparently was not bent on feeding for his tracks merely lead to the next hole in the ice and cloudy water streaming from a hole



THE BURROWS OF THE SHORT-TAILED SHREW

His minute eyes seem barely to distinguish light from dark and he furrows the surface or burrows beneath without seeming to know the difference.

in the bank told that he had not disappeared very long before and was still inside his burrow. Down in the marsh his brothers had built a nice warm house like a beaver's, but this creek-dwelling muskrat had to be satisfied with a hole in the bank.

Crossing a stubble field we could see where a flock of



"THOUGH SHE BE BUT LITTLE, SHE IS FIERCE"

The weasel is a blood-thirsty little beast and is never more vicious than when caught in a trap. In the north, its fur is white in winter and the best grades are known as "ermine." In the summer its fur is reddish brown.

crows had held a breakfast party, digging down for the corn cobs which they had stripped of nearly every kernel earlier in the season. A delicate tracery on the snow beneath a patch of ragweed showed where some small birds had been feeding and the position of the tracks one



A PHEASANT PASSED

The front toes are set at a wide angle and the imprint of the hind toe is a mere dot. The tracks are clean cut and the toes do not drag.

behind the other and the marks of a long hind toenail proclaimed that a flock of horned larks had paused to feed there.

Along the edge of the field a row of large angular tracks announced that a much larger bird had gone by. The three front toes were set at a wide angle and the imprint of the hind toe was a mere dot. The tracks were clean cut and the toes did not drag so we knew that a pheasant had passed that way. We followed his trail through a clump of weeds and then down a little gully through some burdocks where he had apparently stopped for a few moments to feed. Then he continued his

course to a patch of deadly nightshade whose red berries with their belladonna held no fears for him, for we could see where he had jumped after some of the berries that were just out of reach. He apparently had had a good meal, for his tracks then led off into a tangle of sedges where he jumped up almost from under our feet and got away with a great crackling and whistling of wings.

Nearly every sheltered spot held some surprise for us that morning for the happenings of the previous night were plainly written in the snow diary. It mattered not that we had actually seen only a few of the little creatures for we could easily imagine them present and could reconstruct their lives from the records which



THE HOME OF THE MUSKRAT IN THE MARSH

Along the creek the muskrats live in burrows but where material is available they build these beaver-like houses.

they had left. We had seen only a few birds and only three animals but we returned home with the feeling that the woods and fields were teeming with life and that after all a walk at Christmas time could be just as full of interest as one at any other season of the year.

THE ANNUAL MEETING

The annual meeting of the American Forestry Association will be held at 2 P. M., Tuesday, January 13, 1920, in the Assembly Room of the Merchants' Association, Woolworth Building, 233 Broadway, New York City.

There will be no forestry program. The meeting will be confined to business matters and the election of officers.

Later in the year the directors will decide upon the advisability of holding a national forestry conference for the discussion of forestry problems.

THE RACOONS OF NORTH AMERICA

BY R. W. SHUFELDT, M. D., C. M. Z. S.

OF ALL the different kinds of racoons in this country, the habits of the common eastern species are doubtless best known, and, in the main, this is the form referred to in the following paragraphs. The habits of the four or more forms of the South and West may differ more or less, but only to such an extent as they have been influenced by environment, nature of the country inhabited, what is required to obtain the different kinds of foods, and escape from the different kinds of enemies to be found in the regions they inhabit. Aside from all this, however, racoons are racoons wherever we find them, and the general habits of any one of the subspecies will be found to be more or less identical with those of the common species. Of recent years 'coons have been on the increase throughout some of the New England States; it is from such places that we now get good accounts of 'coon hunts, and new chapters on the life history of this interesting animal.

Mr. George E. Moulthrop, of Bristol, Connecticut, sent a very good account of hunting racoons in his State. He says: 'There is probably no section of the state of Connecticut where fox and 'coon hunting is more generally indulged in. The Bristol sportsmen have always owned the best foxhounds and 'coon dogs in the state. Some of the hunters have become very prominent in this line of sport, and none more so than the late W. Barnes, who was the most famous racoon hunter

in the country at the time of his death. A 'coon hunt in this vicinity baffles all description, and it must be attended in order that one may appreciate the excitement that prevails during the entire time of its happening. It comes up to the highest pitch, perhaps, when the dogs have succeeded in putting up into one tree from two to four vigorous old 'coons. It is easy to imagine such a scene, with from two to four of these crafty and plucky

animals up in a thick hemlock tree, fifty or seventy feet in height, with a group of excited men beneath it, carrying lanterns, and promiscuously armed with revolvers, guns, rifles and clubs. With them is a pack of yelping and howling dogs, eager to have the infuriated 'coons tossed down to them, so they may enter into the fray as soon as possible. The climbers quickly ascend; and often they are in luck if, instead of 'coons, they do not meet, in the dense foliage of the dark hemlock, a by



THE COMMON RACCOON OF THE EASTERN STATES

Photograph from life by the author. These coons have a habit not indulged in by any other animal. If given a piece of raw meat they very carefully wash it before eating it.

no means to be despised wildcat. On one occasion this very thing happened; and when the animal was finally slain, it was found to weigh no less than thirty-five pounds. After some little difficulty, the 'coon is at last shaken down; and in the mix-up that follows, in which men, dogs, and all take a hand, there is excitement enough to satisfy the most fastidious. When two or more 'coons are in a tree, generally the remaining ones escape to neighboring trees, and make off through the woods. Then the hunt is on again with even renewed and greater excitement. Occasionally the animal escapes over

some rocky ledge inaccessible to both dogs and men."

This excellent account of a 'coon hunt must answer as a description of one of those interesting hunts; they have for years occurred all over the country, and the variety of incidents would furnish food for a volume.

As much as the writer has shot and collected during the past fifty years, it was not until about the early 80's that he really came into a part of the country where racoons were abundant, and where he could study the various and interesting phases of their life history. Those

were pleasant days when, long ago, he collected in the dense old cypress swamps of the Louisiana lowlands, south of that most fascinating city, New Orleans. It was his greatest delight to get far into those sultry, dark, dismal, and far-reaching stretches of heavy cypress timber, where the trees were festooned with masses of "Spanish Beard." Great moccasin snakes lurked there; and some parts, rendered impenetrable by fallen trees, tangled vines, and deep holes filled with slimy water, were the chosen resorts of alligators and many of the smaller reptiles. Overhead, among the palmettos, the cypress limbs, and masses of subtropical creepers, one's eye often caught the scarlet flash of a

male cardinal, as he inquiringly looked down, or the flaming, orange breast of an old male prothonotary warbler, busily engaged in searching for insects in the brighter regions above the gloom.

Passing to where the footing is somewhat drier and the shade not quite so dense, other forms are met with, and more birds reward search. Presently, part way up a pecan tree, you can recognize an old 'coon rolled up

on a limb close to the trunk. Your stealthy approach was unnoticed until too late; the 'coon now has no means of escape, and evidently hopes you will pass by without noticing it. But in this it is mistaken. Coming to the foot of the tree and gazing up at the old rascal, one is strongly reminded of the old story of Captain John Scott, who had slain hundreds of 'coons, and whose rifle, it was said, had never missed one; the legend runs something after this fashion:

'Coon up in tree—"Who are you, stranger, down there?"

Captain Scott—"Why, my name's Scott."

'Coon—"Do you mean Captain Scott?"

Captain Scott—"Yes, I'm the man."

'Coon—"Do you mean Captain John Scott?"

Captain Scott—"The very same."

'Coon—"Well! If that's so, don't fire; there's no kind of use. I'll come right, straight down."

But the old fellow the writer had so suddenly come across was in better luck, as he had no intention of taking its life; and after a little it was left quite unmolested. They were very common in that region, and many people, including the negroes, kept them as pets.

Further south many still enjoy the sport of hunting this wily ani-

mal on moonlit nights with a pack of dogs; and, owing to the nature of the country, it is a more arduous task than in the northern States. The animal more frequently manages to elude its pursuers. The writer had them alive several times while living in New Orleans; but they were extremely troublesome pets, and quite as mischievous and amusing as a small monkey. On the night of its capture, a very large animal was chained in



THE RING-TAILED RACCOON OF THE SOUTHWEST

This animal is lively and playful, and runs along the branches of the trees with the agility of a squirrel. It is shy and retiring. Its food consists of birds, insects and small quadrupeds. Courtesy of Mr. Hollister, Superintendent of the National Zoological Park, at Washington, D. C.

the yard by a small chain on its hind leg just above the foot. In the morning the foot was found gnawed off just at the point where the easy-fitting link was attached, and the raccoon had made good its departure. It could not endure being made captive, and the relic and chain plainly read: "You may keep the foot, but I must have my liberty."

Racoons will feed upon almost anything. They are very fond of eggs of all kinds, as those of birds, turtles, and snakes; and they also eat grapes, berries, nuts, some roots, and many insects. "All along the coast in the southern States," says a writer, "he finds a species of oyster in which he delights; though we are told he sometimes pays dear for the whistle, as he gets his paw caught by a fixed shell, and, unable to escape, he is

chance to capture one. Some reptiles are also caught and eaten by them, especially snakes. Between flexible snout and wonderfully nimble fore paws, it is indeed capable of prying into and nosing out almost anything that its mischievous mind leads it to do. As already pointed out, it is an excellent tree climber; and woodpeckers, who build where 'coons are plenty, had better bore their holes pretty deep if they care about the safety of their eggs. "Thus," says a writer about them, "the raccoon is an animal of large resources and marked character. He goes prowling about by night as well as by day. He is a fisher, a hunter, a trapper, a reaper, or a fly-catcher, as occasion may require. He is instinctively cunning as a fox, inquisitive and meddling as a monkey, greedy as a bear, sly as a cat. In northern



YOUNG OF THE RING-TAILED RACCOON

Photograph from life by the author. These coons are easily tamed and among Mexicans it is domesticated, when it becomes a playful pet and catches rats and mice.

drowned by the returning tide." These are the "raccoon oysters" we hear of; but the writer never knew of a raccoon that was drowned in that way, nor of anyone who could verify such a tale.

In rearing their young, racoons usually build a nest in a hollow tree, or occasionally in other convenient cavities in the woods. In still rarer instances, they dig furrows of their own, where, in the spring, the female gives birth to her young, the litter varying from three to half a dozen, each being the size of a common rat. Their eyes are closed and for some time they are very helpless; but when a month old, they are very cunning little animals, not to say pretty. It is said that the old ones are not averse to eating a duck or a chicken, should they

climates, on the approach of winter, he retires to his home and sleeps like the bear till spring, or only goes abroad occasionally in fair weather. In the South he is active during the entire year."

Above everything else the raccoon loves the young, green corn, or at that stage of its growth when it is said to be in its milk. He will steal into a cornfield at night, and in the most wasteful manner possible, strip ear after ear, eating his fill of the best he can find, and thus destroying many ears that would mature later. No wonder the farmer is down on him and will shoot him on sight whenever opportunity offers.

In the matter of feeding on fish, the raccoon is not at his best; although a fairly good swimmer, he is not fitted

to pursue fish in the water, though he may, sometimes, capture them in other ways. He very much prefers to hunt at night rather than in the day time; and where the forests are thick, he passes along from tree to tree as readily as on the ground, robbing nests in his course, or pouncing on their owners, or snapping up such insects as fail to get out of his way.

The racoon has a habit that is not indulged in by any other animal. If given a piece of meat, he will not touch a mouthful until he has washed it in as clear water as he can find, and he will allow no one to do this for him. So thoroughly does he perform this task, that he not only soaks all the blood out of the meat, but actually reduces the morsel to a very uninviting, flabby piece of pale flesh. He will roll it over and over in the water with his fore paws, and give it occasional shakings by seizing it in his mouth. Finally, when it is semi-macerated to his liking, he will devour it with apparent relish. The writer has tried racoons with pieces of raw meat; and, although the animal will hold the piece in his mouth, he will immediately commence to hunt around for some water to wash it in. Failing to find any, he soon exhibits his distress and annoyance; in fact, he must be very hungry indeed before he will condescend to eat a piece of raw meat that he has not previously washed to

his complete satisfaction. Racoons will also wash an ear of corn in the same fashion, and it was this habit that prompted Linnæus to bestow the specific name of *lotor* upon this interesting animal.

In their "American Animals," Stone and Cram say that the racoon, "like most other climbing animals, make frequent use of the nests of hawks to sleep in. At other times they flatten themselves along the thick branch of a tree, their gray fur harmonizing admirably with the color of the bark, or else they ascend to the tops of densely foliaged hemlocks, and, circling their fat bodies completely around the main stem, doze away in comfort, supported by the numerous elastic branches about them, quite invisible from the ground. If a company of blue jays discover one in this position, there is sure to be a tremendous racket right away, their shrill voices jarring the quiet of the tree-tops like an alarm clock set to awaken the 'coon from his slumbers."

The racoon has a peculiar cry at night; it is not unlike the note of several species of owls that inhabit the same region, and may easily be mistaken for it. Tame racoons, especially when they have been reared from the young, are wonderfully playful in captivity, and will often amuse themselves by the hour toying with any small object suspended a foot or so above the ground by



AN ADULT COATI-MUNDI

Redrawn by the author. In nature this animal is met with in troops made up of a number of individuals. They are excellent climbers and feed upon honey, insects, eggs, various fruits and vegetables, small quadrupeds, and probably other animals.

a string. The knowledge of this, and the habit the animal has of running the entire length of every fallen tree he comes across in his rambles in the woods, has suggested to trappers an easy means of capturing him. All that is necessary is to set a strong steel trap on the upper side of any long tree trunk lying upon the ground, and suspending directly above it by means of a string any small, bright thing, such as a piece of tin, at a height that a 'coon can reach by standing on his hind legs. It is certain to tempt him, either on a moonlit night or in the daytime. Utterly regardless of the naked trap beneath it, he at once stops in his course to have a toss with it, and the chances are that, inside of a minute, he knows what it means to have a big steel trap seize him by one of his hind feet. His liberty—maybe his career—is at an end, unless he resorts to gnawing the fastened foot off above the point of seizure.

When they sleep away the cold snaps in the winter, it is not an uncommon thing to find a whole family, or maybe several families, curled up together in the hollow of some big tree. If the weather chances to become warmer, they will drowsily awaken; and if it is very pleasant, they will all come out, descend, and prow around through the woods in the neighborhood of their winter home. Occasionally they find something to eat at this time; still, toward spring, they become very thin and hungry, and do not get fat again until early in the summer, when all kinds of food is once more to be found in plenty. If there is snow on the ground, their characteristic tracks may easily be recognized. With the oncoming of another cold snap, the entire party at once hie themselves to their hollow to sleep through it, huddled up together like a lot of squirrels.

Although the ring-tailed racoon can hardly be considered a game mammal, it is one, in a sense, as it is an animal that may be eaten or shot for its pelt. In any event, the hunter in the southwest desires to know something about it when he meets with it—hence this brief description. The habits of this animal are still but little known owing to the fact that it is almost entirely nocturnal, and resides in the rough, rocky, and heavily timbered regions.

The ring-tailed racoon is a small animal, with an elongate, slender body. As will be seen in the cut, it

has a very long and somewhat bushy tail. This is banded black and white, the extremity being black. Its muzzle is pointed, and its eyes and ears are rather large.

An account says about its disposition that "this animal is lively and playful, running along on the branches of the trees with the agility of a squirrel. It is shy and retiring, and speedily flies to its retreat, which is a hole in a tree, at the slightest alarm. Its food consists of birds, insects, and small quadrupeds; it is said to also feed on the pecan and other nuts, though this is doubtful. Sometimes it scolds or barks at an intruder, holding its tail curled over its back. It is easily tamed; and among the Mexicans it is domesticated, when it becomes a playful pet and catches rats and mice. It produces three or four young at a birth."

But few lines can be spared here for description of the Mexican coati. Upon seeing this animal, one is at once struck by its long and flexible snout, and the general elongation of the body and tail. It is about the size of a large cat, and it is said it has a habit of gnawing off its tail at the root; but the writer cannot in any way vouch for this. The coatis are excellent climbers, and they feed upon honey, insects, eggs, various fruits and vegetables, small quadrupeds, and probably upon other animals. When once tamed they become gentle, and they have not a few amusing habits in confinement. However, they are restless and possessed of all the curiosity of a 'coon, to which they are more or less nearly related.

At the present time there is no mounted specimen of this animal on exhibition in the United States National Museum, and there are very

few reliable cuts of it extant. This being the case, the writer has reproduced a figure from one of an old work on natural history, which gives an excellent idea of the animal.

The typical racoons and their allies is a comparatively small group of mammals exclusively American in their habitat; they constitute the family *Procyonidae*, containing, according to most authorities, five well-recognized genera, namely, *Procyon*, *Bassariscus*, *Bassaricyon*, *Nasua*, and *Cercoleptes*. The first of these contains the type of the genus to which it belongs—the common racoon of the United States and its subspecies; also the crab-eating racoon of South America, and perhaps



THE RACOON HOUSE IN THE NATIONAL ZOOLOGICAL PARK, WASHINGTON, D. C.

In this quaint little log cabin reside numerous individuals of the common Racoons. There are both adult and young specimens, and all of their habits may be studied here to the greatest advantage. Frequently they climb among the topmost twigs of the tall tree to the right, not far from the foot of which is placed a small, cement-lined pool, in which they wade about and where they are often seen washing their food.

others. In *Bassariscus* we have the ring-tail *Bassariscus*; also *B. sumichrasti* of Central America, and possibly others. *Bassaricyon* is not represented in our fauna, neither is *Cerculeptes* of South and Central America. *Nasua* contains the coatis and coati-mundis, and of these Flower recognized two species, the Mexican coati (*N. narica*) and the South American species, *N. rufa*. It is claimed that the first named has occurred over the Mexican boundary line, in the southwestern part of the United States.

In the true racoons the body is rather stout, with the head broad posteriorly, but tapering to a pointed muzzle anteriorly. The feet are plantigrade and their soles without hair; toes all free and capable of being spread wide apart, especially in the case of the forefeet. Claws are non-retractile, curved, compressed, and acute. The cylindrical tail is moderately long, annulated, and inclined to be bushy. Pelage somewhat long, coarse, and thick. The ears are rather short.

The *Bassariscus* somewhat resembles the true racoons, but the body is more elegantly proportioned, and slenderer. In the short head the muzzle is markedly pointed. The tail is longer and conspicuously annulated; the ears are large. The soles of the feet are hairy but the pads are hairless.

The species of the cogenus *Nasua* depart considerably from the general form and appearance of the typical racoon; both head and body are elongated and somewhat laterally compressed. The non-prehensile, annulated tail is also long and tapering, while the muzzle is mobile and inclined to be turned up.

CUTTING WOOD FOR FUEL

MANY farmers now have their home supplies of wood for winter fuel, but the town markets will keep active for several months, and thousands of cords of wood will still be cut for local use on the farm.

In cutting cordwood, an excellent opportunity is afforded to improve the woodland by removing the poorer, less valuable trees, leaving the better ones to grow. Many farmers who have never before given this subject a thought are taking a real interest, because they see how quickly nature responds in better growth when given a little guidance and aid.

The kinds of material to be removed for firewood include the old trees unsuitable for lumber, crooked trees crowding out straight ones, badly diseased and decaying trees, small trees overtopped and stunted by larger and better ones, dead trees that are mostly sound, tree tops left from former cuttings, and trees of the less valuable kinds, where others of greater value are present which need the room and will prove faster money-making trees. Handling farm woodlands rightly is an indispensable part of profitable farm management.

If lists of manufacturers or other information are desired regarding portable wood-sawing outfits, and wood-splitting and tree-felling machinery, the Forest Service of the Department of Agriculture will be glad to furnish such material upon request.

NURSERYMAN BELIEVES IN DYNAMITE

BY O. B. STRAYER

THERE is considerable controversy in the agricultural papers as to whether it pays to use dynamite in tree planting in the sandy loam soils of Southern Alabama, where a great deal of pecan and satsuma orange planting is going on. Ordinarily I should say that it does not pay, because the open-soil types do not need blasting. However, I find that the J. M. Kroner Nursery, of Theodore, Alabama, does not agree with this view. They use and recommend dynamite in their tree-planting operations.

Not only that, but they have used it to subsoil their nursery plots, and claim to have gotten excellent results from the practice.

However, there is a reason for that that may not exist in all parts of the region. A little way beneath the surface of the soil there is around here a thin layer of hardpan. Sometimes it will not be over three inches thick. It is very seldom found to be over 15 or 18 inches in thickness. Nevertheless, it is very impervious to moisture, and it is difficult for the feeding roots of young trees to penetrate it. It is to break up this layer of hardpan that Mr. Kroner advocated blasting. He says that the trees they have planted on these hardpan soils have done exceptionally well as a result of the treatment; when dynamite has not been used, and the hardpan comes up close to the surface of the ground, shallow, lateral-rooting of the trees has resulted, and many of them have been difficult to cultivate and others have died from lack of moisture.

Shallow-rooting is a habit of the satsuma orange tree. Nevertheless, the roots do not want to come up so close to the surface that the top soil cannot be cultivated.

As for the pecan, of course, everybody knows it is a tap-rooted tree, and if it is to do well it is absolutely necessary that it should be able to send its roots down deep into the soil. If a layer of hardpan prevents that, the tree is almost certain to be a sickly specimen, assuming that it lives at all.

FIGHT WOODS FIRES

Forest destruction is quick — forest growth is slow.

Everybody loses when timber burns. The forest exerts an influence that modifies local extremes of heat and cold and benefits crops, live stock, and man.

Burned timber pays no wages — keep the forest productive.

Take no chances with lighted matches, burning cigarettes or pipe ashes, brush fires, or camp fires.

A tree will make a million matches — a match may waste a million trees.

When a fire is discovered, put it out if you can. Get help if you need it.

Are you practicing fire prevention and forest protection?

MEMORIAL TREES IN 1920

NOW comes 1920 and with it greater promise for tree planting than any year in the history of our country. In memorial tree planting there has been brought about a great awakening to the value of trees. The American Forestry Association has never before in its history had so great a number of inquiries in regard to tree care and tree planting. With the closing of the war came the thought of memorials and the living, growing tree was suggested and then urged by the association as the memorial of the individual. Now the tree has

become the memorial of the town, city, county and state.

In the schools throughout the land there has been created an amazing demand for tree knowledge and the American Forestry Association is pleased to announce that plans are being worked out whereby tree planting will be fostered in thousands of schools throughout the country. The planting of a memorial tree for Lieutenant Quentin Roosevelt by the pupils of Force School, Washington, D. C., which young Roosevelt attended while living in the White House, has been a great inspiration to



MEMORIAL TREE FOR PHILADELPHIA NURSE

This tree, beside which Dr. Richard H. Harte, head of Base Hospital No. 10 is standing, was planted on the grounds of the Pennsylvania Hospital, Philadelphia, for Miss Helen Fairchild, who died in France. Five other trees were planted in memory of men of that Base Hospital. The trees have been marked by Mrs. Arthur Gerhard who registered them on the national honor roll of the American Forestry Association.

thousands. The American Forestry Association received the following telegram in regard to it:

"We wish to express our appreciation of your action. So many of my brother's happiest associations were connected with the old Force School.

"THEODORE ROOSEVELT."

With the planting of that tree there was adopted a plan which is being put forward in many schools. There is at Force School a self-perpetuating "Quentin Roosevelt Memorial Tree Committee." Miss Janet McWilliam, the principal, appointed a member of each class as a committee to care for the tree and this committee is to remain on the school rolls through the simple process of allowing each member to name his successor when he passes to another class. In this way there will be a tree committee at Force School as long as the tree and the



THE TREE PLANTING AT KEARNEY, CALIFORNIA

This is part of the crowd that witnessed the tree planting, and General Strong stands in the center of this group.

school shall stand. The members of this first committee are: Oliver Gasch, 8A; Frank Norris, 7B; Earl Moser, 7A; George Wales, 6B; Alice Spalding, 6A; Burke Edwards, 5B; Virginia Douglas, 5A; Nell Tysen, 4B; Nancy Fair, 4A; Mary Church, 3B; Lindsay Payson, 2B, and Dorothy Harrison, 1B. At the planting of the tree the tree day program of the American Forestry Association was used. The pupils who were assigned to "What the Tree Teaches Us," were: Lillian Rixey, Edna Kelley, Miriam Latterner, Duncan Bradley, Henry Wilson, Richard Bedon, Juliet Frost, Oliver Gasch, Virginia Fourier, Anna Hereford, Margaret Watts, Robert T. Norman, Harry Lamberton, Roger Robb.

But tree planting is not a matter of this year or even of next, for the country is now experiencing, through the efforts of the association, a great campaign of education as to trees. A fine example of what comes of tree planting propaganda is seen at Rockford, Illinois, where a tract of 150 acres has been purchased by the

Park Board and named "Memorial Park." The intention is, Paul B. Riis, the superintendent, informs the association, to plant a memorial tree in the park for every man who enlisted from the county. This means that somewhere in the neighborhood of 3,500 trees will be planted. Playgrounds, golf links and picnic grounds are to have trees. Are the members of the American Forestry Association awake to the good work that can be done by each one in his locality if he or she will but take the lead? John A. Collier Wright, of Gilbertsville, New York, is working for plans for reforesting and for "Roads of Remembrance" in Otsego County. He reports to the association that a survey in Broome County shows there are 14,000 acres of waste land suitable for reforesting. Frederick W. Kelsey, of New York City, contributed a fine letter to the *New York Times* in regard to the work of the association, which that paper used in full. It will be seen that the newspapers are eager to hear about the values of tree planting particularly if they hear it from their own readers.

Where there are trees is where the association finds the keenest activity for having more trees. This is particularly true of California where the California Federation of Women's Clubs, through Mrs. P. B. Goss, chairman of the department of conservation, is making plans



THE FIRST SHOVEL FULL OF EARTH

The first shovel of dirt for the memorial tree planting at Camp Kearney, California, was turned by Mrs. Isabella Churchill, of the Colorado State Society of San Diego.

for an active campaign for memorial tree planting. In Georgia Mrs. Julia Lester Dillon, of the same organization had thirty-one district clubs planting a Memorial Park on Arbor Day in each district. Georgia will carry off the blue ribbon, if one is awarded, for memorial tree planting if other states do not hurry. The year 1920 will be a big one in tree planting and each member of the association can help to make it bigger. The time to start is now.

WHEN MEMORIAL TREES ARE PLANTED PLEASE INFORM THE AMERICAN FORESTRY ASSOCIATION, WASHINGTON, D. C.

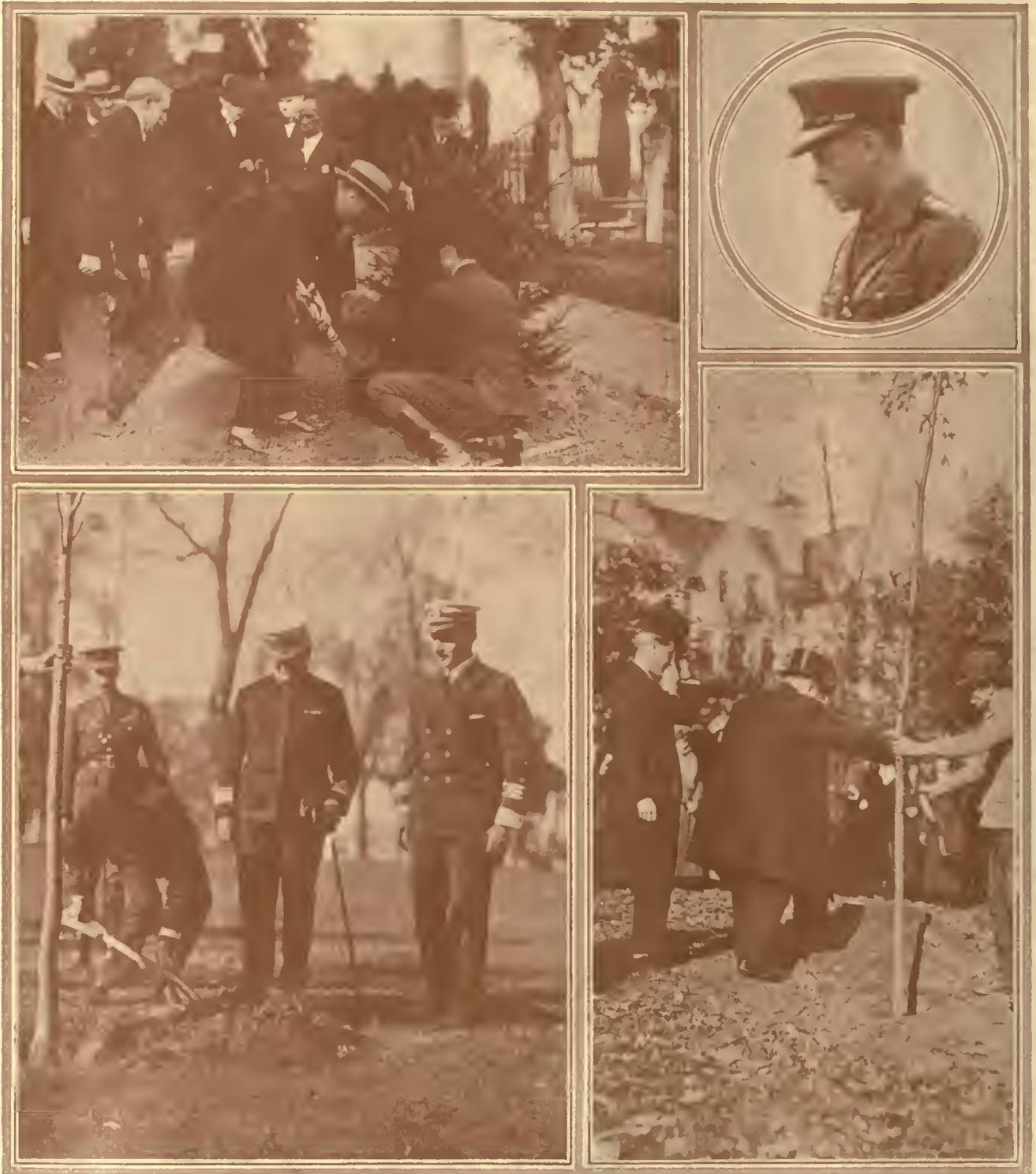
THE EUCALYPTUS SHADES THE WAY



Underwood and Underwood

A hundred years from now the memorial trees you plant will tell the story of the glory of those for whom the trees were planted. Trees such as these at Fresno, California, show what can be done with the "Roads of Remembrance" idea of the American Forestry Association.

TREE PLANTINGS BY THE PRINCE OF WALES



At the top the prince of Wales is shown planting a tree at Mount Vernon, Washington's home. On the right he is seen taking part in the tree planting at Mount Saint Albans Cathedral, Washington, D. C., and doffs his hat while Bishop Alfred G. Harding places the tree. In his navy uniform the prince is seen wielding the shovel at Annapolis during his visit to the Naval Academy. This picture is by Underwood and Underwood and the other three are by Harris and Ewing.

THE PRINCE PLANTS A TREE IN CENTRAL PARK



Western Newspaper Union

On November 21, the prince of Wales planted an English Elm tree in Central Park, New York City. It was placed 100 feet from a rugged American Elm planted by his grandfather. The Prince was welcomed by Charles Lathrop Pack, president of the American Forestry Association, and Dr George F. Kunz, president of the American Scenic and Historic Preservation Society. The Prince, flanked by his two aides, is seen advancing to take the shovel at the right of Secretary Percival S. Ridsdale, of the American Forestry Association.

A REAL "ROAD OF REMEMBRANCE"



Underwood and Underwood

This road is on Missionary Ridge, a scene of one of the famous battles of the Civil War and finely shows the possibilities of road side tree planting along our highways as memorials for the heroes of the World War.

JOHN BURROUGHS TO THEODORE ROOSEVELT



Courtesy The Garden Magazine

John Burroughs planted a tree in memory of Theodore Roosevelt in the grounds of Country Life at Garden City, New York, the corner stone of which Colonel Roosevelt laid. The naturalist selected a maple and promised himself some "fine maple sugar twenty years from now." The naturalist will be 84 years young next April.

MEMORIAL TREES THE PROPER SETTING.



Allison and Allison, Architects.

That memorial trees should be the proper setting for whatever form a memorial may take is shown in the architect's drawing for the proposed Greek Theater as a memorial to the soldiers of Santa Monica, California. This memorial will be unique among structures of similar kind in this country says the Los Angeles Times. It will be in the form of a magnificent Greek theater, and in addition to being a lasting monument to that city's gallant service men it will have an educational value of recognized importance. H. M. Rebox, superintendent of the Santa Monica schools, originated the plan, which has the hearty indorsement of the school authorities. Huntington Park, Long Island, will commemorate the share her soldiers and sailors had in the war by erecting in City Hall Park a memorial fountain designed by Burt W. Johnson, the sculptor, and Myron Hunt, the architect. A drawing of it is reproduced below. In giving the proper setting of memorial trees to a memorial Mr. Johnson writes *American Forestry*: "In a memorial forest erect small but permanent and beautiful monuments. Two ideals could be expressed. The trees and birds of symbols of the beautiful things in life. The other idea would be to illustrate the material contribution of the forests toward winning the war"



THE BIRCH ROAD AT BETHLEHEM, N. H.



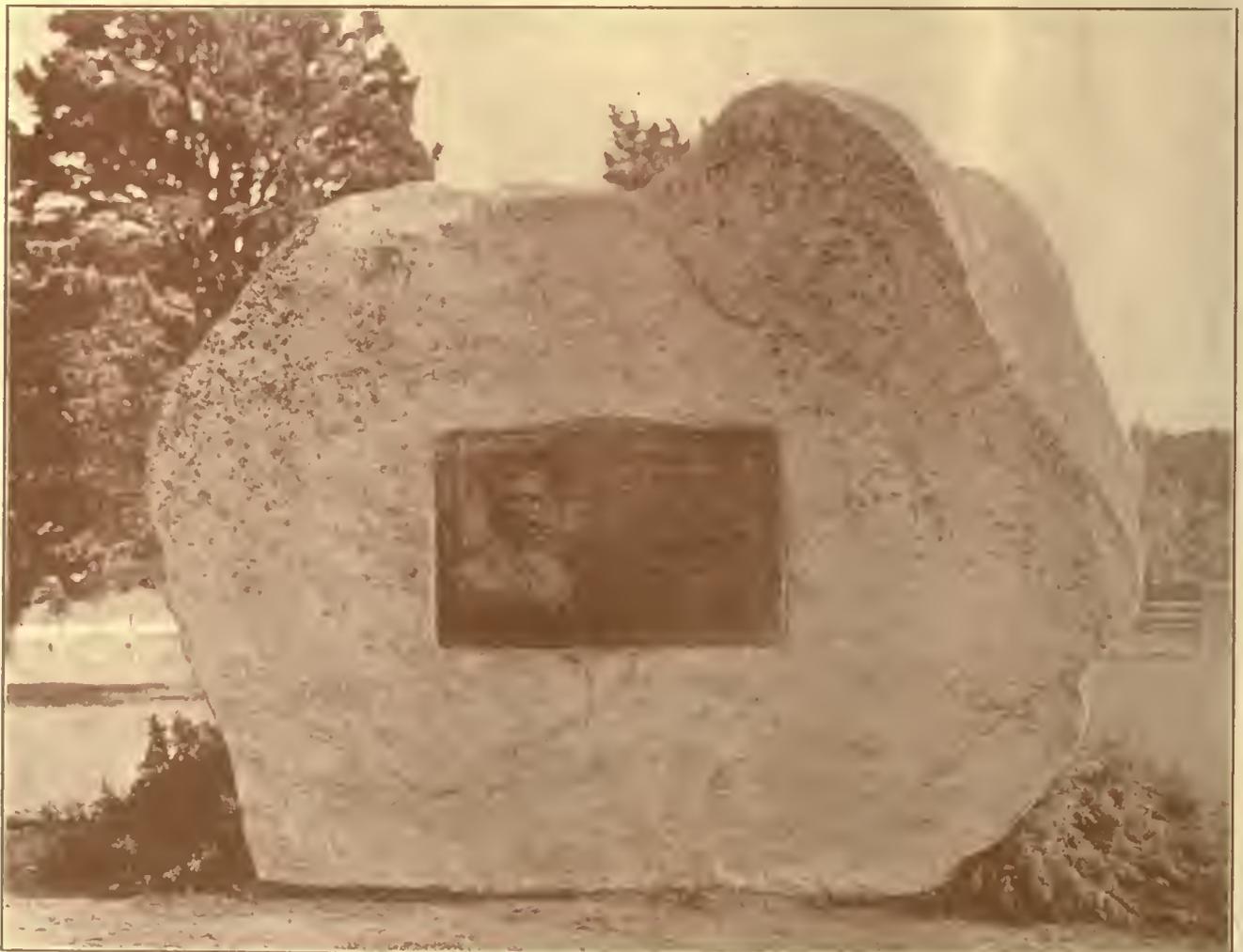
Underwood and Underwood

The value of birch for "Roads of Remembrance" is that their color aids in following the road at night. This drive is widely known and shows what a heritage can be left for the future in the road side tree planting, which has been taken up so widely throughout the country.

MORRELL PARK FOR THE PEOPLE



In memory of General Edward de V. Morrell the park at Bar Harbor, Maine, has been dedicated to the people by Mrs. Louise Drexel Morrell, of Philadelphia, and a boulder, weighing more than fifty tons, appropriately marked, has been placed at the entrance of the park. The portrait on the bronze is by Allen F. Newman. The bronze was executed by the John Williams Company. On behalf of the Board of Trustees, T. DeWitt Cuyler, of New York accepted the gift for the people of Bar Harbor. Judge Deasy introduced Bishop Walsh, of Maine, who presented the deed to Mr. Cuyler. There are two tracts in the park totaling about 68 acres. Many improvements had been made in the acreage and the action on the part of Mrs. Morrell is but an example of what fine things can be done in the way of memorializing an individual with parks and trees. It is such memorials that will stand for all time and they should be approached by "Roads of Remembrance" making them easy of access by the residents of a locality or by visitors.



MEMORIAL BRIDGES PLEASE THE EYE



Underwood and Underwood

In the building of "Roads of Remembrance" memorial bridges could well have a part in the program for honoring our war heroes. As suggested by the American Forestry Association, avenues of memorial trees should be the proper approach to such structures such as this at Pasadena.

HOW VINELAND HONORS HER HEROES.



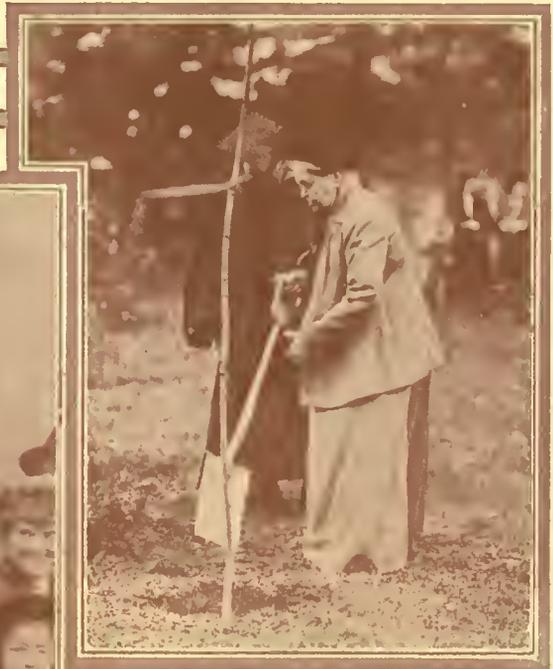
One of the most unique memorial tree settings in the country is at Vineland, New Jersey. The memorial spot is the center of a forty acre tract. The trees have all been registered with the American Forestry Association. There is a circle of forty old tulip trees, seventy feet high. This circle is nearly a thousand feet in circumference. It is planted with tulip trees. Four streets extending from different sections of the city intersect with a circular driveway outside the coping. This is a natural setting which Vineland was fortunate in having had by systematic tree planting and parking fifty years ago. Within this circle the memorial was built. Twenty-two evergreen trees, Koster Blue Spruce and Douglas Fir were planted alternately in an inner circle, each tree personifying a soldier or sailor who gave his life in the World War. Each tree is designated by a granite marker fourteen inches wide and eighteen inches long and twenty inches high. A bronze plate attached to the beveled top of the marker bears the name, age, and data relative to the army or naval service, and place and date of death of each soldier and sailor.

A cement walk runs around the circle close to the markers. From this walk the inscriptions may be read. Cement walks lead from the four entrances to the center where there is a flower bed fifteen feet in diameter. At the south entrance there is a granite stone seven feet high, bearing the dedicatory inscription in bronze.

The memorial was designed by Wilbur H. Fenton, City Florist, and was built under the personal supervision of Walter H. Blake, President of the City Beautiful Committee, into whose keeping the memorial has been placed by the city officials for preservation. The scheme was financed by popular subscriptions by the Diamond Social Club, and so universal was the response for funds, that the whole community feels a personal interest in it. The cost was less than five thousand dollars.

Visitors from twenty different states have all said that it is unlike any other memorial, and prettier than any they have seen. Vineland is therefore proud of the evident fact that it has the most unique and beautiful of tree memorials.

AFTER FIFTY YEARS AT SWARTHMORE



Miss Susan Cunningham, a member of the faculty when the college was founded, plants an oak tree; and below Isaac H. Clothier, with his son Morris L. Clothier and President Joseph Swain, places a tree.



Courtesy of the Philadelphia Inquirer

In costumes of long ago students at Swarthmore College rehearse the founding exercises which marked the opening of the school fifty years ago. Memorial tree planting had a big part in the program. Miss Cunningham taught mathematics to Governor Sproul and A. Mitchell Palmer, now attorney general of the United States. She is the only living teacher of the original faculty and, with the elder Mr. Clothier, saw Lucretia Mott and her son plant two oaks marking the founding of the school fifty years ago. Swarthmore sets a fine example to other educational institutions of the country in memorial tree planting.

A TREE FOR QUENTIN ROOSEVELT

In a pouring rain the pupils of Force School, Washington, D. C., which Quentin Roosevelt attended when he lived in the White House, planted a Lombardy Poplar in his memory on Armistice Day. At the left is Gordon Minnegorode, of the eighth grade, who spoke of Roosevelt's life from school days to entering the army. Just to the right of the tree is B. W. Murch, supervising principal of the school, who was there when Quentin attended. In the overcoat at the right is



Captain Harry Semmes, of the Tank Corps, and a graduate of Force School, also spoke. As far as known Lieutenant Roosevelt was the only Force graduate to lose his life in the war.

In the lower picture is Henry Wilson whose father, Admiral Henry Wilson, was in command of the American Naval Base at Brest, and he lent the school the American and French flags which waved over his headquarters in France for the tree planting.



Underwood and Underwood

This committee of pupils of the Force School comprise the first self-perpetuating memorial tree committee in any school in the United States. Miss Janet McWilliam, the principal appointed a pupil from each class as a member of the committee. This pupil upon passing to the next grade or out of the school appoints a member of the committee for the class the pupil is leaving. Thus as long as the tree and Force School exist there will be a Quentin Roosevelt Memorial Tree Committee at Force School. The members with their grades are: Dorothy Harrison, 1B; Lindsay Payson, 2B; Mary Church, 3B; Nancy Fair, 4A; Nell Tysen, 4B; Virginia Douglas, 5A; Burke Edwards, 5B; Alice Spaulding, 6A; George Wales, 6B; Earl Moser, 7A; Frank Norris, 7B; and Oliver Gasch, 8A.

MEMORIAL TREES IN 1920
SERVICE STAR LEGION PLANTS TREES



Upper Photograph by Leopold Lower Photograph by Bradley

Fifty memorial oaks were planted in Baltimore when the Service Star Legion women met in convention. Plans are now under way for memorial tree planting by every chapter. In the picture from left to right are Mrs. T. Parkin Scott, Madame Jusserand, J. J. Jusserand, the French ambassador, Mrs. J. Barry Mahool, Mrs. Robert Carlton Morris, of Toledo, Ohio, president of the Service Star Legion, Mayor Broening, of Baltimore, and Governor Harrington, of Maryland. Mrs. Morris is now working out plans whereby every tree planted will be registered on the American Forestry honor roll.

AMERICAN FORESTRY
PERSHING PLANTS ARMISTICE TREE



Underwood and Underwood

General Pershing planted a Redwood in Lafayette Park opposite the White House on Armistice Day.



The Hill School at Pottstown, Pennsylvania, planted a memorial tree in honor of her sons when the corner stone of a new building was placed last month by Newton D. Baker, the Secretary of War. In the picture are: Dwight R. Meigs, '02; Archibald M. Thomson, '19; Percival T. Gates, '17; George P. Berry, '17; M. Herbert Bowman, '02; Kenneth Howard, '09; Harold B. Hoskins, '13; Roswell Miller, Jr., '14; W. Reginald Wheeler, '07; H. Lawrence Schilles, '08; Archibald Dudgeon, '14; Montgomery Blair, Jr., '17; William S. Crawson, '85; Joseph Buffington, Jr., '14; Seward B. Collins, '17; James McD. Clawson, ex-'19; George W. Hittner, '08. These men all answered their country's call to service and several won decorations.

STEADY "WAKE 'EM UP" BARRAGE

THE TRIBUNE CALLS FOR ACTION

UNDER the heading "Factories Peril Own Lives With Trees They Kill," the *Chicago Tribune* takes up the campaign of the American Forestry Association for a national forest policy. The *Tribune* bases its drive on a purely business argument and warns the industries of the Middle West in the following language:

"Approximately a fifth of the manufactories of Illinois, Indiana, and Ohio depend on wood for their running.

"In from ten to twenty years, at the present rate of unregulated cutting, unattended as it is by any systematic replanting, the lumber from the South will be exhausted.

"Then the Pacific Coast will be good for forty years, but it will be too expensive for the purposes of our factories to ship timber so far. Hence the factories will either succumb or be moved into the Pacific area. In either case we shall lose them.

"In these three states of Illinois, Indiana, and Ohio there is a great deal of soil that should not be farmed, if it is, because that soil is so poor that it does not pay the farmer a fair return for extraordinary severe effort.

"Some specialists estimate this unprofitable area at one-sixth of the total area of the three states. This estimate probably is excessive.

"On many of these farms people do manage to eke out an existence, but it is a growing economic waste to have generation after generation continue the struggle.

"But trees don't need so much humus as grains and grasses do. Trees are a mineral feeding proposition.

"You can grow good trees where you cannot grow good barley.

"Not dabbling in prophecy, but considering the foregoing facts, the state and county forests of Illinois, Indiana, and Ohio have formed, on the initiative of Ranson E. Kennicott, chief forester of the Cook County Forest Preserve, the Central States Forestry Association.

"The new organization hopes to hold its first meeting in Chicago next April.

"Its object is to formulate a tri-state forestry policy and urge upon the state governments the necessity of extreme measures of forestation and reforestation, and the

establishment of a system of restricted cutting that shall be in some proportion to the amount of replanting.

"The estimate of some members of the association, notably Mr. Kennicott, is that the three states could profitably put something like a seventh of their area into commercial forestry.

"The association bases its campaign on both the natural and the commercial advantages to be derived from a liberal policy of reforestation.

"First, the trees are needed to conserve moisture and prevent erosion, which is progressing in late years at an alarming rate.

"Second, the three commonwealths cannot retain their wood-using industries if they don't provide the wood for them.

"State authority and state aid in reforestation will be asked because private capital is not going to go into a proposition that looks as far forward as forty to sixty years for the richest part of the return. It's got to be the state.

"On the other hand, reasonably prompt returns are not excluded if the system of forest management be comprehensive.

"If you have absolutely to reforest bare land it will be about forty years before you can get a steady income from it.

"But from second growth and coppice areas, if treated scientifically, you can get a revenue in ten years.

"The first thing you get out, by a scientific treatment, is eight-inch ties. And if you treat a hickory forest right you get your revenue just as soon as you can cut ax handles. Five-inch hickory gives four ax handles.

"Here is an important point: There has been a kind of superstition among foresters that not more than \$10 an acre ought to be paid for forest land for commercial cutting, but that tradition is outdated now by the fact that the cost of most varieties of lumber has tripled in the last ten years.

"Only science and authority make prompt commercial cutting possible in reforested areas.

"Think, wood workers, what the newspapers are up against in the matter of wood pulp, and ponder your case."

LIKE the fabled Johnny Appleseed, who went from town to town, planting as he went, Charles Lathrop Pack, president of the American Forestry Association, is going up and down the country advocating the planting of trees, hammering day and night on the need of a national forestry policy. The demand for Memorial Avenues, Roads of Remembrance, Victory Boulevards, all planted with trees in honor of the men who

gave their lives for their country, is meeting with a remarkable response. Women's clubs, churches, rotary clubs, kiwanis clubs, patriotic societies and individuals are planting trees in rows, groups and groves.—*Pittsburgh Post*.

The American Forestry Association is urging the planting of memorial trees and creating "Roads of Remembrance," as a

simple and effective way of bringing the great principle of reforestation before the public mind and keeping it there. To interest the people in trees is the first step in the process of establishing such automatic recognition of the value and need of a national forest policy as shall be effective to save wide areas of country from climatic calamity, create great wealth in timberland, and avoid the present serious loss by

EDITORS FOR NATIONAL FOREST POLICY

fires. The foresters have hit upon an excellent idea: to plant trees as memorials of distinguished men has an appeal which is of genuine service to all the people as well as carrying a romantic tradition of enduring strength in the national character. Mr. Charles L. Pack, the president of the American Forestry Association, urges the planting of trees in all parts of the country as memorials to Theodore Roosevelt at this time of general commemoration of his birthday; recalling Roosevelt's strong interest in the subject, Mr. Pack says: "I do not believe the human mind can devise a more suitable memorial to Theodore Roosevelt than a movement which will look to preserving the forests of the country."

The foresters point out that the forests are like a bank account; they cannot be continually drawn upon without making some deposits. A national forest policy is a need which cannot be gainsaid; it is not a project for the benefit of the lumberman or the papermaker alone; it is in the interest of the whole population.—*New York Evening Sun*.

The American Forestry Association points out that the demands of France and Belgium may double the call for American lumber. Three and a half billion board feet of logs and lumber were exported annually before the war; seven billion may be needed now. In 1918 the fire loss was \$28,500,000, not much if one is thinking in billions, but a good deal from any other point of view. The acreage figures are more impressive: Eight billion four hundred million acres were burned over. The layman can do little to increase the stock of trees. But he can do a good deal, especially at this time of year, to save what we have. He can be careful with his camp fires, whether he thinks the ranger will catch him or not, can watch where his matches and cigarette stubs go, and can teach the gospel of fire caution to other people. The forests of

California are not ours alone; they belong to the nation.—*San Francisco Call*.

The coal miners' strike has brought vividly to the public comprehension how dependent the country is on the coal supply. Wood is the only practical substitute for coal, and wood can be produced in unlimited quantities. Forests have been for

pulp out of which print paper is made is consuming the growth of thousands of acres of forests annually.

Without regard to fuel, a wood famine would be almost as great a calamity as a coal famine, and it should be provided against.—*Nashville Banner*.

Great Britain has determined to spend \$17,000,000 in a ten-year campaign to replant as forest areas 250,000 acres of land to replace timber used during the war in France.

The United States could do no better than to follow the example of Great Britain and determine at once upon a broad plan for reforestation. Thus far the lumbering industry in this country has been one big problem in subtraction. If the nation does not begin to add and multiply before long, the only possible answer will be zero.—*Athens, Ohio, Messenger*.

It is gratifying to note that there is considerable interest in tree planting in Peoria at this time. No little of this interest is due to the campaign of the American Forestry Association which is attempting to get people to "plant a tree in America for every tree destroyed during the war." The forestry men are specially alert in their efforts to get trees planted along roads and public driveways—thus putting to practical use much land that has been bearing little except weeds in the decades gone by.—*Peoria, Illinois Journal*.

With thousands more interested in trees, thousands more will be interested in the ways and whereof of forest policy.—*Minneapolis News*.

The president of the American Forestry Association of Washington has issued a call to the people to beautify their highways as memorials to the men who fought for world freedom. Good roads and tree planting go hand in hand.—*Elkins, West Virginia, Inter-Mountain*.

EVEN A COAL STRIKE MAY HAVE SOME BENEFICIAL EFFECT IF IT LASTS LONG ENOUGH



Copyrighted 1919 by the New York Tribune, Inc.

This cartoon by Darling points forcibly to the value of a woodlot regardless of whether we have coal strikes or not.

centuries systematically conserved in Europe, and we must emulate and improve on the European example. And it is not because alone of the possibility of an exhausted coal supply that a production of wood is needed. There is an insatiate and increasing demand for lumber that can't be met after awhile if the forests are not replenished, and the demand for wood

a national forest policy.—*Minneapolis News*.

The president of the American Forestry Association of Washington has issued a call to the people to beautify their highways as memorials to the men who fought for world freedom. Good roads and tree planting go hand in hand.—*Elkins, West Virginia, Inter-Mountain*.




STATE NEWS



CALIFORNIA

THE number of fires and the damage resulting in the area covered by the Weeks Law agreement in California during the 1919 fire season conclusively shows the necessity of increased co-operation under this law.

An appropriation, made by the California Legislature for fire protection work, became available July 22 and on July 25 four Weeks Law patrolmen were appointed by the State Forester and took up the task of preventing and combating fires. Approximately three million acres of the Sierra Nevada watersheds in Northern California were thus, for the first time, brought under protection.

The district assigned to each patrolman was large, too large in fact, to permit the effective patrol work that is necessary. The area placed under protection is one of great fire hazard due to climatic condition. At the same time its value as a watershed is immeasurable.

One hundred and sixteen fires occurred in the protected area during the eighty-two days of the fire season that remained after the appointment of the Weeks Law men.

Several of the fires, had they not been systematically fought, would have swept from the foothills into the National Forests.

Residents of the districts in which fires occurred expressed great satisfaction with the assistance given them to combat flames that threatened their property. Several landowners expressed a desire to aid financially the work of the fire patrolmen. In one county the Supervisors, wishing to do their share toward protecting property in the county, voted to pay bills for food required by fire fighters called by patrolmen.

Sentiment in favor of fire protection work was greatly increased in the counties in which Weeks Law men worked. While the men were kept busy much of the time with fire fighting they still found time in which to organize voluntary fire fighting companies, arrange for the placement of county equipment in districts of fire hazard and at all times they preached the gospel of fire prevention.

The fire season just closed has been one of the most serious on record in California, owing to a succession of dry seasons and the presence, during the fire season, of extremely high winds. It makes one shudder to think what would have been the result in the Sierra foothills during the recent summer months had there been no fire protection work. As it is the fire-blackened district is far too large and additional co-operation under the Weeks Law as well as increased appropriations by

the state are necessary if the ravages of fire in the foothills of the Sierras are to be stopped.

IDAHO

IN accord with almost unanimous sentiment in Idaho and in response to considerations vitally affecting adjoining National Forests, Congress has set apart 1,116,000 acres of land in Idaho known as the Thunder Mountain region, as National Forest lands. This great tract, difficult of access and having not over one per cent of its area suitable for agriculture, has for years been the scene of destructive fires and devastation due to overgrazing. It is now to be added to the Payette National Forest which adjoins it on the south and west, and the Idaho National Forest which adjoins it on the north and west. The area lies approximately 100 miles northeast of Boise. Because uncontrolled, it has been a recurring menace to the adjoining National Forests by reason of fires that have gained great headway in its vast unpatrolled regions.

IOWA

A REPRESENTATIVE of the Forest Service who recently visited Iowa calls attention to the fact that there is still a considerable area of timberlands in the State. The value of these lands has been only partially appreciated, according to the forester. Three-quarters of the Nation's timberland is privately owned, while but one-quarter is Government owned, and consequently it is in the privately owned forests, as well as the others, that conservation must be practiced. To avoid an increasingly serious timber shortage, it is essential that all of these lands be properly handled to produce timber and other forest products.

Because of the present high price of lumber the timber resources of Iowa have assumed an importance entirely unlooked for a few years ago. The representative of the Forest Service declared that there is a good opportunity for farmers of southeastern Iowa, particularly, to make use of their nonagricultural lands and the islands of the Mississippi by planting quick-growing trees, such as cottonwood. He also urged farmers to use small corners of their farms for this purpose.

MAINE

THE Legislature of 1919, by making an appropriation of \$5000.00 for the year 1919 and \$10,000.00 for the year 1920, for purchase of lands and general forestry purposes, made it possible for the State Forestry Department to start two new pro-

jects, namely, Forest Fire Protection and Slash Disposal in Organized Towns. Prior to this year, the organized towns with a forest area of about 4,500,000 acres never had any fire protection of any kind; while the unorganized towns (so called wild lands) are protected by a good sized appropriation and a good organization of Chief Wardens, Deputy Wardens, Watchmen, and Patrolmen. The present forest law makes the selection of each organized town Forest Fire Wardens of their respective towns, but does not provide for any funds either to protect the forests or fight fires. Without funds these Forest Fire Wardens are almost helpless. By the passage of the above named appropriation it gave the State Forestry Department a chance to start some forest protection in organized towns. Two steel lookout towers were erected, one on Agamenticus Mountain in the town of York and the other on Ossipee Mountain in the town of Waterboro, both in the County of York. These towers are located in the heart of the best white pine section of the State of Maine and are equipped with telephone communication with the Selectmen of the towns covered by these places, panoramic maps, binoculars, and range finders. The department contemplates establishing two more stations, one in the town of Denmark and the other in the town of Parsonsfield. The view from these two stations will reach the view from the nearest station in the Maine Forestry District which is located in the unorganized town of Grafton.

MONTANA

ONE billion feet of timber killed by 1445 fires is the estimate given for Montana's tremendous forest fire losses for the season just closed. Half of the fires were started by human agency and were preventable. The fires burned over 570,000 acres of land and were suppressed at a cost of \$1,200,000, according to figures compiled by the forestry office at Missoula.

A district logging engineer with headquarters at Missoula reports that he has seen cedar trees more than 2000 years old, still alive and growing in the Kaniksu forest which is in the extreme northeastern corner of Washington. "These trees," says the engineer, "varied in size from a foot to ten feet in diameter. I used a boring instrument on them and found that the trees were in all cases 2000 years old and some of them nearly 3000. The wood is firm and is a potential source of high grade timber. I know of no place in the United States, except the redwood forests; where trees of that age may be found."

NEW JERSEY

New Jersey has been extremely fortunate with regard to fire losses during the past summer and fall, in comparison with other sections of the country. The excessive rainfall has almost prevented fires from starting. From August 1st until the middle of November there have been less than ten fires in the entire state, and all of these have been trifling. For this period the total has usually been from 150 to 300. Last year during the four months there were 152 fires, while the year before there were 241.

The three year terms of most of the local firewardens within the state expire at the end of the year. The freedom from fires has enabled the staff to devote much of its energy to the reorganization and strengthening of this field force. The dead wood is being replaced by good timber, and special efforts are being made to insure that wardens who have displayed ability are reappointed.

The withdrawal of one of the division wardens from the Forest Fire Service to take up educational work brings about the first change in the staff of the state organization.

NEW YORK

THAT America can produce better forests than nature has given us, under right application of forestry was the declaration of Dr. Hugh P. Baker, Dean of the New York State College of Forestry at Syracuse before the American Paper and Pulp association in convention at New York, when the nation's paper makers asked him to discuss the report of their committee on forestry. He said: "The long growing Adirondack and other forests today not aided by man, may be growing at the rate of 200 board feet per year. The Black Forest, and other forest areas of Europe, not as well adapted to forest growth as very much of the forest area of this country, before the war were producing more than a thousand board feet per acre per year, and at the same time conserving water more effectively, were better places for fish and game, and were as effective as man can make a forest for recreational purposes.

"The difficult coal situation which has been before the public and our national government is educating the people in this country to the point where it is barely possible that the public may force the maintaining of productivity of forest lands as it looks as if the government may force the productivity from coal mines. It will be much better if the forest industries will solve these problems themselves by providing unity of action rather than to be forced into an awkward situation by what seems to be public welfare.

"New York probably leads the states of the union in the reforestation of forest lands. Great credit is due the State Con-

servation Commission for the aggressive way in which it has carried on reforestation. What they are doing, however, is but a drop in the bucket. What is the reforestation of three or four thousand acres when the State alone owns hundreds of thousand of acres which must be partially or wholly reforested before they can be put into profitable condition. The state should bond itself, if necessary, to protect and encourage the forest industries of the state as has been done for better highways and a great barge canal. There should be inducements held out to the owners of agricultural land to get better farm crops. Forestry is second in importance to agriculture as a fundamental to the life of a nation."

Uncle Sam has given formal recognition to the State Ranger School of the New York State College of Forestry at Syracuse, by sending to the school four of his wounded soldiers, and by preparing to send others from all parts of the United States. While going to school they are being paid \$80 a month from the government. The Federal Board of Vocational Training has particularly been interested in the opportunity for building back into profitable occupations those soldiers whose lungs were torn by gas, or who were injured in battle, by sending them into the big out-of-doors where they can be trained for service which gives them an open air life.

OREGON

AT a meeting of forest protective agencies held at Klamath Falls, Oregon, October 21, and 22, 1919, representatives of the United States Forest Service, State Forest Service of Oregon, Klamath Indian Service, Crater National Park, Oregon Agricultural College, Western Forestry and Conservation Association and Klamath-Lake Counties Forest Fire Association being present the following resolutions were unanimously adopted:

In view of the importance of the forest industry in the State of Oregon and the large percentage of the taxes of the State paid by said industry, and since insect depredations in the timber are in certain localities a decided menace, we feel that greater attention should be given to forest entomology in the state. We, therefore urge the Oregon Agricultural College to build up a strong department of Forest Entomology and through such department lend assistance to owners of timber in the state in control of insect depredations.

In view of the serious fires which occurred in Oregon the past season and the expense involved in fighting said fires, it is apparent that the appropriation for protection of Oregon and California Grant Lands will not be sufficient to pay the pro rata share of cost of protection of said lands. We, therefore urge upon our Congressional delegation that they use every

effort to see that \$15,000.00 additional be provided for protection of these lands the current fiscal year.

In view of the yearly damage to timber (particularly yellow pine) resulting from insect depredations, and the imperative need of perfecting methods for the control of said depredations, we earnestly request the United States Forest Service to increase its personnel in Oregon for such work and further ask that the service cooperate with and extend assistance to private owners in the State of Oregon looking to more efficient insect control.

Whereas, the grazing areas in the State of Oregon are being reduced yearly owing to homestead occupation, reproduction of forests, etc., a growing congestion on the ranges seriously threatens the live stock industry unless some federal regulation is provided on all public lands; and

Whereas, there are over three million acres in the Oregon and California Land Grant, more or less of which will provide feed for live stock pending disposal under the public land laws;

Resolved, that we respectfully urge the Department of the Interior to adopt and put into effect a policy of leasing the grazing privileges on these Oregon and California Lands to live stock growers, and that the proceeds be used to increase the present appropriation for the protection of said lands from forest fire.

Whereas, there are located in Deschutes, Klamath and Lake Counties, State of Oregon approximately 83,000 acres of land being administered by the Interior Department of the United States Government on which is growing more or less lodgepole pine of little commercial value, but which constitutes an extremely bad fire menace to adjoining National Forest Lands and lands belonging to private individuals or companies on which is growing a stand of commercial yellow pine timber, and as our state laws require the private owners to provide an adequate fire patrol to prevent loss from forest fires, and to do so it has been necessary in the past for said owners to patrol and fight fires upon the Interior Department lands for the protection of their own interests;

Therefore, we urge upon our representatives in Congress the necessity for an appropriation of not less than \$5000.00 per annum to be used for the protection of these lands; and we urgently request the Secretary of the Interior to make request for this amount of money for the above purposes in his next annual budget.

WISCONSIN

THE Forest Products Laboratory, at Madison, has prepared a list of government and state bulletins of value to woodlot owners who wish to market their products. This list will be furnished by the laboratory to anyone upon request.

The Dangers of Decay

Wooden back porches and stairs of apartment buildings, factories, warehouses, and other industrial structures must be protected against decay to avoid becoming a serious menace to tenants, employees, and the public; likewise to reduce the continual expense of replacement, piece by piece.



Replacement of porch columns and joists in framing of three floors is an annual occurrence at most apartment houses of this type.

Arrows point to a badly rotted column on the third floor, to a new column just put in on the second floor, and on the walk to rotted columns and stringers already taken down.

The grade of lumber generally employed and the nature of the exposure, cause rapid development of decay and unsuspected weakening of the structure, particularly at points of contact.

It is, perhaps, a very small detail—to protect these structures from premature decay, but a precaution that the builder should encourage from the standpoint of safety and economy. Elimination of decay is physical protection to all, children and adults alike.

Carbosota Creosote Oil, properly applied to points of contact before erection, will retard decay and materially increase the life of even the cheapest lumber.

Used as a stain, it gives the structure a practical and attractive dark brown color, at considerably lower cost than paint.

Carbosota Creosote Oil is a pure refined coal-tar creosote, standardized for non-pressure treatments.

Wood Preservation is a "Safety-First" measure.



Applying surface treatment by spraying Carbosota on contact surfaces.

(Green wood cannot be effectively creosoted by non-pressure processes. It should be air-dry. In regions of moist, warm climate, wood of some species may start to decay before it can be air-dried. Exceptions should be made in such cases and treatment modified accordingly.)

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CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

THE advisory committee which was asked for by the Minister of Lands and Forests of Quebec to discuss with his Chief Forester a revision of the cutting regulations and also the future forest policy of the Province, held its first meeting in Quebec City and after a very interesting discussion agreed to certain recommendations to the Minister. The most important of these was that there be appointed a committee which should represent the lumber and pulp interests, the settlers' interests, and forestry and that this committee should act in an advisory capacity to the Minister of Lands and Forests and his Department in framing regulations for the use and perpetuation of the forests. It is hoped that if this suggestion is adopted most of the present causes of friction between the lumber interests and the settlers can be eliminated.

The forest fire situation in New Brunswick during the past season was better than in the previous year. So many fires were due to carelessness that October ninth was adopted as "Fire Prevention Day" throughout Canada to try and impress on people the necessity for care in preventing all kinds of fires. The total number of fires in New Brunswick's forests for the season were 342—70 per cent set by railroads causing 3.5 per cent of the damage; 7 per cent set by campers causing 31.7 per cent of the damage; 11.5 per cent set by settlers causing 44.1 per cent of the damage; 3.5 per cent set by operators causing 7.1 per cent of the damage; 8 per cent set by accidental and incendiary causing 13 per cent of the damage. Most of the fires occurred in May and June. The above shows that campers and settlers were the chief contributing causes. Eighteen square miles were burnt with a loss of \$154,155. Thirty-six prosecutions were instituted with 29 convictions. About 70 miles of telephone lines were built co-operatively by the Government and the Bathurst Lumber Company and forty more miles will be built to connect with a lookout station. Twenty-six returned soldiers were employed. Four hundred and ninety acres of land belonging to the Bathurst Lumber Company have been set aside as a forest reserve and experimental cuttings are taking place under a plan worked out by Dr. Howe and in immediate charge of Forester W. M. Robertson.

The same kind of work is being done under the supervision of Mr. R. W. Lyons on the Vermillion Limit of the Laurentide

Company, Ltd. The Department of Lands and Forests has been asked to set aside these experimental areas as forest reserves.

The fire season in Quebec has been, from the standpoint of weather, the worst in several years, but the number of fires was not large. Contrary to the experience in New Brunswick, practically no difficulty was had with settlers. The worst fires were caused by dam-keepers and river-drivers of the operators. This is a most curious situation, as these operators are paying the cost of fire protection and are hiring the fire rangers, so that they are not only destroying their own property but it is being done by their own employees. Of course the answer is the lack of an appreciation of the necessity of preventing forest fires on the part of some of the managers of woods operations and their failure to enforce the rules of their departments. Often the sub-managers and higher foremen feel that the fire protection work, in some way, takes away from their authority and interferes with their work, and then too, sometimes they are afraid their men may leave if they are particular about enforcing the fire regulations. The situation is serious and heads of companies should insist that their own men are controlled and not allowed to set forest fires.

Mr. S. L. de Carteret, Forester for the Brown Corporation, will now be in charge of all the timberlands of the Brown Corporation, with headquarters in Quebec City. Mr. de Carteret was, for several years, engaged in working up a scheme for timberland insurance, which he handled very successfully.

Mr. L. A. Nix, graduate of Syracuse University, sometime with the U. S. Forest Service, and who served during the war in the Chemical Division at Edgewood Arsenal, Baltimore, has resigned from the staff of the Forestry Department of the St. Maurice Paper Company and returned to the Laurentide Company for whom he worked before enlisting.

A very interesting article on the work of the Forestry Department of Syracuse University, appears in the Royal Spanish Society of the Friends of Trees.

The Canadian Export Paper Company, Ltd., of Montreal, is sending Mr. W. G. Mitchell abroad to make a study of conditions in the Pulp and Paper Industry in Scandinavia, Finland and Russia.

The Aviation Branch of the St. Maurice Forest Protective Association has completed its work for the season and the planes loaned by the Government will be thoroughly overhauled and put in condition for further experimental work next season. Four hundred pictures 8x10 inches, covering 4,000x3,200 feet each, were taken at an altitude of 5,000 feet. The pictures show all kinds of country, settled, villages, swamps, burns, cut-over, regenerating naturally, planted and all sorts of timber types. Those so far developed and printed exceed all expectations and it is confidently felt that aerial photography will revolutionize timber mapping. The accuracy with which areas in various types, burns, water and so forth can be measured, drainage basins determined and topography studied will add much to the value of the work. Those wishing to buy timberlands, or banks, or other corporations loaning money on timberlands can now be sure of what they are getting for their money.

Alarm is now being felt in Queensland at the very rapid depletion of available timber supplies, particularly softwoods. The Forestry Service is now facing the heavy responsibility of attempting to make good the deliberate dissipation of the forest asset which has characterized the past. Forest reservations have been set aside and now total 3,700,000 acres, but the task of reforestation has been left so late that it will be many years before its effect will be felt.

In Norway it is proposed to build a tunnel to carry logs past a large dam built for water power development. This is an interesting way of solving the problem.

There is practically a complete failure of the white spruce seed crop in the east. The trees in eastern Canada have not seeded for two years and Black Hills and Norway spruce seed has had to be used. Likewise, owing to the rapidly increasing demand, the prices of nursery stock have risen tremendously.

The seaplane purchased by the Brown Corporation, one of two which will be used in mapping their timberlands, was last reported as having flown from New York to Burlington, Vermont. It is expected to arrive at its base on the St. Maurice River shortly.

The plantations made by Chief Forester G. C. Piche, of the Quebec Forest Service, on the drifting sands at Lachute and Ber-

No. 1

The Making of Southern Pine

FIRST the forest cruiser, lone explorer, and advance agent of the lumberman, judges and chooses with keen, appraising eye the prime stands of virgin woodland. A great sawmill is erected. More thousands are added to the millions of persons in America who derive their livelihood from manufacturing trees into lumber, and another thriving prosperous community is added to the five hundred maintained by producing Southern Pine—that sturdy, dependable material which still is and always has been the least expensive, most easily available building material in the world.

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thier some seven years ago, have made splendid progress and are now six to ten feet in height for Norway spruce and eight to ten feet for white pine. These plantations were made to stop the encroachment of the sand on farming country and have answered the purpose admirably. The growth of the spruce in absolutely pure sand is quite remarkable. It is too bad that the plantations have not been continued.

Messrs. Clyde Leavitt, J. M. Swaine and Arnold Hanssen made a trip to the limits of the River Ouelle Lumber Company at River Manie, in the company of W. G. Power, President of the Canadian Lumbermen's Association, to investigate the ravages of the spruce budworm and spruce bark beetle. They report that the trees are beginning to recover from the attack but that the number of spruce trees blown down as the result of cutting to a diameter limit is very large, causing a great deal of waste.

A course in paper-making has been started in the Laurentide Night School with

forty-five entrants. The course will begin with lectures on forestry and will be followed by others on logging, wood preparation, grinding, sulphite making, paper-making, purchasing, selling, engineering and management. One hundred and fifty pupils are enrolled for the winter session of the school.

Robson Black, Secretary of the Canadian Forestry Association, has finished a most successful lecturing trip through the Prairie Provinces. He has held ten public meetings in Winnipeg alone, sometimes at the rate of two or three per day, addressing business men, bankers, mortgage companies and so forth. In Prince Albert he had an audience of 700 men and women. Much enthusiasm for the conservation of timber resources was aroused and the idea has taken firm root. The Forestry Car which is making a tour of the country has met with the greatest success.

The reports of damage from forest fires in the Prairie Provinces during the past summer will run into millions of dollars.

FOREST SCHOOL NOTES

UNIVERSITY OF CALIFORNIA

THE Forestry Club has had three interesting meetings since October 1st. Twenty-five men left Berkeley early Sunday morning, October 5th and went by train and boat to Fairfax, for a hike through the picturesque hills of Marin County. The route of the trip was across a chapparal covered ridge to the new La Guitas reservoir of the Marin Municipal Water District. This artificial lake with its well forested watershed is now full to capacity for the first time and has added greatly to the natural beauties of the region. After following down La Guitas Creek to the junction of the Little Carson Creek a halt was made for lunch beneath the shade of some fine redwood, Douglas fir and Tanbark oak trees. The afternoon trip brought us back to Fairfax by way of the headwaters of the Little Carson. Twenty-five species of trees were noted during the day.

The next regular meeting was held on October 17th, when Professor David T. Mason spoke to the club about his work with the Treasury Department in the administration of the income tax to the lumber industry.

An open air meeting in the Berkeley Hills was held on October 28th at the old camp fire place in Telegraph Canyon. After a hearty meal of "weenies," coffee and pie, Mr. S. B. Detwiler, who is in charge of the White Pine Blister Rust eradication, told the boys something of the character of the work being done in scout-

ing for the disease and the nature of the quarantine by means of which it is hoped that it may be kept out of the western forests. Mr. Posey, who is directing the work in California and several of his field men were also guests of the forestry club at this camp fire meeting.

During the regular business session it was decided that the forestry club should recommend to the Associated Students' organization the planting of a memorial grove of Sequoia gigantea on a suitable site in Strawberry Canyon to the 80 University of California men who gave their lives in the World War. It is hoped that the work can be done as the "Labor Day" project by the entire student body on February 29, 1920. It has been the custom for several years for students and faculty to lay aside regular duties on this extra day and all join in some work of improvement of beautification needed about the campus. The forestry club feels that the planting of such a memorial grove is the most fitting way in which the coming Labor Day can be spent.

Professor Woodridge Metcalf spent a week end recently with the Santa Cruz high school forestry class which is being conducted by R. E. Burton, a former president of the University of California Forestry Club. An interesting field trip through some of the cut over lands in the vicinity of Santa Cruz was made the opportunity for pointing out the necessity for permanent forests in this region. Many

(Continued on Page 1563)

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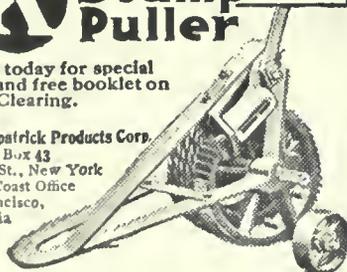


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OUTSTANDING \$7,500,000

Dated November 15, 1919.

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Due in annual installments of \$375,000 each November 15, 1920 to 1939 inclusive.

Interest payable without deduction for any Federal Normal Income Tax up to 2%

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HISTORY AND BUSINESS

The Brown Company, founded in 1852, is the largest manufacturer in this country of bleached sulphite fibre pulp and kraft wrapping paper and it also manufactures bond paper, lumber and allied products. Sales in recent years have averaged more than \$23,000,000 annually. Its operations in Canada are conducted through a subsidiary, the Brown Corporation, of Canada, of which the Brown Company owns all the capital stock.

PROPERTY

The mill properties at Berlin and Gorham, N. H., consist of two paper mills, two sulphite fibre mills, a saw-mill and five hydro-electric plants with an installed capacity of 25,000 H. P. and a steam power plant with a capacity of 20,000 H. P.

The Canadian plant consists of a pulp mill and water-power for manufacturing sulphate fibre, which product is shipped free of duty to the American plants.

A practically perpetual supply of raw material is assured by ownership in fee simple of more than 400,000 acres of timber land in Maine, New Hampshire and Vermont, and the acquisition in Canada through the Brown Corporation of more than 800,000 acres in fee simple and stumpage and about 1,700,000 acres in timber limits under perpetual license. Total holdings are over 4,530 square miles, conservatively estimated to contain 15,000,000 cords.

ASSETS

The cash investment in the American mill properties alone is over \$14,000,000.

After the application of the proceeds of these bonds the net quick assets of the Brown Company will be in excess of \$12,000,000, and the tangible assets applicable to this issue in excess of \$38,000,000.

The combined tangible assets of the affiliated companies are in excess of \$50,000,000.

EARNINGS

Earnings of the Brown Company, as certified by Messrs. Niles & Niles, Certified Public Accountants, for the last five fiscal years, after taxes, depreciation and interest have averaged \$2,190,222, or nearly five times the interest on this issue, and for the last three fiscal years have averaged \$3,102,369, or nearly seven times the interest on this issue, to which are to be added the earnings of the Brown Corporation for the last three fiscal years, averaging \$507,617.

In addition to the above earnings, special reserves have been set up by the Brown Company during the last five years averaging \$445,658, and by the Brown Corporation during the last three years averaging \$272,617.

PROVISIONS

The Indenture securing these bonds has been so drawn that no further mortgage may be placed upon the present assets while any of this issue is outstanding. The Company covenants to maintain net tangible assets of 300% of Series "A" at any time outstanding, and total tangible assets of 200% of total liabilities, so long as any bonds issued under this Indenture remain outstanding. Furthermore, the Company will maintain net quick assets, exclusive of inter-company accounts, at not less than 75% of all bonds of Series "A" and previously issued funded debt outstanding, and at not less than 50% of the total funded debt outstanding during the life of any bonds issued under this Indenture.

| MATURITIES | APPROXIMATE | |
|-----------------------------|-------------|-------|
| | PRICE | YIELD |
| 1920 to 1922 inclusive..... | 100 | 6.00% |
| 1923 and 1924..... | 99½ | 6.15% |
| 1925 to 1929 inclusive..... | 99 | 6.15% |
| 1930 to 1934 inclusive..... | 98½ | 6.15% |
| 1935 to 1939 inclusive..... | 98 | 6.15% |

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The statements contained herein are not guaranteed, but are based upon information which we believe to be accurate and reliable, and upon which we have acted in the purchase of these bonds.

BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

| | |
|---|--------|
| FOREST VALUATION—Fillibert Roth..... | \$1.50 |
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| LUMBER MANUFACTURING ACCOUNTS—By Arthur F. Jones..... | 2.10 |
| FOREST VALUATION—By H. H. Chapman..... | 2.50 |
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* This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.

FORESTRY PRIZE ESSAY OFFER

A PRIZE essay on forestry is being offered by the Indiana Division of Forestry, the subject being: Private versus State Forests.

The contest is open to the pupils of both public and parochial schools. For the best essay from the seventh and eighth grades, respectively, a prize of \$5.00 will be given. For the best essay from each of the high school classes a prize of \$7.50

will be given. The offer is made to all schools doing work equivalent to the grade or high schools. The essay must not exceed 2,000 words. It must be mailed not later than May 15, 1920, to the State Forester at Indianapolis, Indiana, Room 7, State House. Contestants should write the State Forester for particulars and rules governing the contest.

BOOK REVIEWS

THRIFT AND CONSERVATION, by J. F. Chamberlain. J. B. Lippincott, Philadelphia. Price, \$1.40.

Very aptly is the President quoted in this little book, just from the Lippincott presses—"To practice thrift in peace times is a virtue and brings great benefit to the individual at all times." During the last few years, and especially since the beginning of the war, the term "thrift" has been much more in the public mind and on the public tongue than heretofore. Men and women are talking thrift and economy; children are writing essays on thrift and are earning and saving as never before. There are lectures and published plans and outlines telling how to earn and invest and save, and the authors have set forth in this book the needs for this teaching of thrift, together with many practical applications of the thrift principles to the life of the people as made possible through such teaching. The causes leading up to the spend-thrift practices of our people are set forth and the necessity for rational habits in proper saving and economy are made plain. And the distinction between true and false economy is carefully pointed out all through the book, *i. e.*, thrift does not consist in hoarding or in miserly practices. One does not save in order to have simply but in order to have that he may use wisely. He saves against the time of emergency, in his own life and those dependent upon him, and that he may do his part in community or state through the channels of public or private service. So changed is the attitude of the public mind that where formerly a man of thrift and saving tendencies was looked upon with something of contempt and pity, now the man who is not reasonably thrifty or economical is the object of more or less adverse criticism. It has at last become dignified to conserve instead of waste—to practice thrift rather than spend foolishly and we predict that this book by the Chamberlains will point the way for many who wish sincerely and intelligently to establish the habits of thrift.

The 1919 Forest Club Annual, of the College of Forestry and Lumbering, at the University of Washington, Seattle, which is just out, is full of interest and value. Its compilation reflects great credit and the organization, and editors of the Annual, are to be congratulated on the publication. A few copies are available to interested foresters and lumbermen, who may procure a copy by writing to the Secretary of the Forest Club, University of Washington, Seattle, Washington.

FOREST SCHOOL NOTES

(Continued from Page 1560)

of the thirteen boys in the class are planning to take up forestry in the University.

Professor Walter Mulford has been appointed a member of the Research Committee of the Save the Redwoods League, which organization is conducting a very active campaign for the setting aside of some of the finest bodies of redwood in Humboldt County as either National or State parks. The chairman of this committee is Meritt B. Pratt, now deputy State Forester, but formerly assistant professor of Forestry at Berkeley.

UNIVERSITY OF MONTANA

THE Forest School opened on October 1st with an enrollment of 60 students, of whom nearly half are non-residents of Montana. States represented are South Dakota, Illinois, Ohio, Iowa, California, Washington, Colorado, Connecticut, Indiana, New York, Wisconsin, Missouri, Minnesota, Nebraska, Massachusetts, South Dakota, Kansas, and Idaho. Also one student from Canada, one from New Zealand, and two from the Phillipine Islands.

The Forest School counts itself very fortunate this year in having among its students Felix Franco, and Placido Decaney who are foresters from the Phillipine Islands. These gentlemen are native Filipino foresters of a group of five Phillipine forest officers who are being sent to schools of forestry in this country at the expense of the Phillipine government. Both of these men have graduated from the government school of forestry in the Phillipine Islands and have had experience as Forest Supervisors in the Phillipine Forest Service.

The Forestry Club has started its series of lively meetings. Special consideration is being given this year by the members of the Forestry Club to the question of a national forest policy.

The annual meeting of officers of the Forestry Club resulted in the election of H. Whisler, a senior student, as president of the Club for the forthcoming year. R. A. Williams, William Zeh and G. M. DeJarnette, all junior students, were elected treasurer, secretary and vice-president.

Dean Skeels recently visited the annual session of the Pacific Logging Congress at Portland, Oregon, and a convention of representatives of the faculties of the schools of Forestry in the state universities of California, Oregon, Washington, Idaho and Montana. Dean Skeels has made an interesting report of the proceedings of the Logging Congress. Of especial interest to foresters of the northwest was the consideration given by the Logging Congress to conservation and forest protection prob-

lems in general and particularly to the issues which are leading towards the definition of a stronger policy of forestry for the nation.

Steps are being taken through state authorities for the acquisition of the Fort Missoula timber reservation as a working forest for the School of Forestry.

The faculty is co-operating in an important way with the Forest Service members of the Missoula branch of the Society of American Foresters in preparing a preliminary plan for such part of a national forestry policy as will apply to the intermountain region.

As a part in furthering a better policy of forestry Dean Skeels and Professors Spaulding, Fenska and Lansing are also preparing material for a complete report to the state authorities of Montana regarding the present forestry problems relating to state lands and looking towards improvement of the state policy for forestry matters in general.

New features for the short course for Forest Rangers which has for twelve years been held during the winter quarter of the school year will be courses of specialization in grazing and forest engineering.

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Trees have been planted for the following and registered with the American Forestry Association, which desires to register each Memorial Tree planted in the United States. A certificate of registration will be sent to each person, corporation, club or community reporting the planting of a Memorial Tree.

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By Force School: Lieut. Quentin Roosevelt.
By Tenley School: Elmer Kidwell, Benjamin Perry, Aubrey Reed, Hart Sonneman.

MONUMENT, COLO.

By Monument Red Cross: George P. Hagedorn, William H. Freeman, Francis J. Lavulette, George A. Bougher, Rex R. Wilson.

NEW HAVEN, CONN.

By Mr. George A. Cromie: Lieut. Samuel Osborn Cromie.

MIDDLETON, GA.

By Middleton School: Hascal Carl Smith.

WARE COUNTY, GA.

By Canteen Unit, American Red Cross: James Jules Beaton, James Brown, Alvin Claude Bozeman, Eugene Campbell, Fred Capps, Claude De Witt Crumless, Norman Ernest Daniels, Erley Davis, Dellie Gilliard, Lewis Gillis, Ivey Lee Gunter, Franklin Lewis Henderson, Aaron Holt, Lewis H. Hopkins, John Kelly, Warren Thompson Kent, Archie B. Liles, L. D. Moody, Clyde Mott, James A. Pierce, Milton Worth Porter, Leon Ray, William Rogers, Wadley E. Sharpe, Ralph Smith, John Spaulding, Charles S. Walden, Lonnie James, Jefferson D. Stow, Frank Teuten, Peter Archie Thrift, Andrew Thrift, Alfred W. Turner, Dewey White, Gerald Yarborough.

CHICAGO, ILL.

By Flossmoor Country Club: Corp. James M. Frothingham.

SOUTH BEND, IND.

By Impromptu Club: Howard Urquhart Snyder.

BINGHAM, MAINE

By Kennebec Chapter, D. A. R. & Century Club: Bingham, Maine heroes.

ORLANDO, MAINE

By Richard Gott: Wm. P. Hutchins.

ANDOVER, MASS.

By Mrs. C. W. Ward: Andrew K. Dunn.

SHARON, MASS.

By Mrs. W. E. Clark: Charles R. Wilbur.

MANCELONA, MICH.

By Antrim Iron Company: Jakow Shelobodi, William Bohl, Donald May, Venerable Lamerson, George E. Puckett.

FORT OMAHA, NEB.

United States Army Balloon School: Walter J. Sorenson, Ellsworth B. Rinehart, Albert Lewis Coldiron.

SPRING LAKE, N. J.

By Dr. and Mrs. G. D. Murray: Jane A. Delano.

WEST COLLINGSWOOD, N. J.

West Collingswood School: Theodore Roosevelt, Robert Shields.

CHAUTAUQUA, N. Y.

Chautauqua Bird and Tree Club: Grant S. Norton.

EAST HAMPTON, LONG ISLAND, NEW YORK

By Dr. H. Lawrence Dowd: Meredith L. Dowd.

SCHNEVUS, N. Y.

By Mr. Thomas Broxholm: Samuel F. S. Broxholm.

WHITESBORO, N. Y.

Men's Bible Class of First Presbyterian Church: Copie Van Hessen, Fred Lamphere, Harry Sautter.

CLEVELAND, OHIO

By Theodore Dluzyuski: Walter Dluzyuski.

COLUMBUS, OHIO

By Independent Protestant Church: Richard Ninehart, Walter Biderman.

NORTH LIMA, OHIO

By Trustees of Union Cemetery: Soldiers of Beaver Township who served in the World War.

CROSS CREEK, WASHINGTON COUNTY, PA.

By Mrs. Samuel Sturgeon: Theodore Roosevelt.

DOWNINGTON, PA.

By Frances Edge McIlvaine: Randolph Breese.

LEWISTOWN, PA.

By Miss Maggie E. Stine: Sergt. Ernest E. Stine, Paul N. Bostain.

PENBROOK, PA.

By Penbrook Community Civic Club: Boys of Penbrook District who died or were killed in Great War.

PROGRESS, PA.

By Penbrook Community Civic Club: Boys from Progress District who gave their lives in the Great War.

NASHVILLE, TENN.

By Robertson Academy: Lieut. John W. Overton.

ALEXANDRIA, VA.

By Parish Aid Society, Christ Church, which Washington attended: Sergt. Major John M. Leadbeater, Lieut. George Moncrief Anderton.

ST. ALBANS, VT.

By Woman's Club: Company B. of St. Albans, Machine Gun Company.

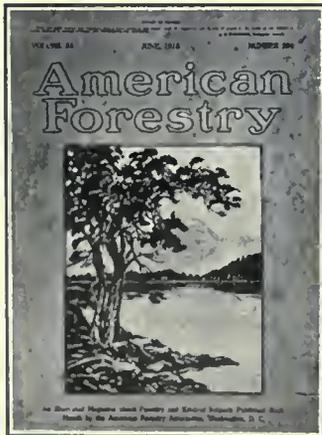
APPLETON, WIS.

Appleton High School: Edward Mach.

KOHLER, WIS.

By Village of Kohler: Soldiers and Sailors, Sheboygan County.

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UNIVERSITY OF WASHINGTON

THE College of Forestry at the University of Washington opened the first quarter of the school year with an enrollment of 135—the largest in the history of the school. Students are registered from many sections of the United States and from Chile, Siberia, Sweden, England and the Philippines.

At a recent meeting of the Forest Club, Mr. F. E. Pape, Washington State Forester, outlined the four routes for the airplane fire patrol to be instituted in this state next summer.

The Hon. Clark V. Savidge, Commissioner of Public Lands of Washington, also addressed the foresters. He brought out the surprising fact that if all the state lands of Washington were in one block they would make an area twice the size of the state of Delaware. These lands are being handled solely for the benefit of the educational institutions of the state, and the schools are now realizing the interest on sixteen million dollars derived from state lands. While no forestry other than fire protection is being practiced at the present time, Mr. Savidge is looking forward to forest management of these lands when favorable conditions for making a start have been worked out.

The Forest Club, composed of the students in the College of Forestry, has entered on what promises to be the most successful year yet experienced, and the seventy entering freshmen are showing great interest and enthusiasm in the activities of the organization. The officers for the ensuing school year are, Willis G. Corbitt, of Seattle, president; S. S. Andrews, Boulder, Colorado, vice-president, and J. Kenneth Pearce, Portland, Oregon, secretary-treasurer. Arthur K. Roberts, Tacoma, Washington, will edit the 1920 "Forest Club Annual," of which Jack Shank, Alton, Illinois, is business manager.

TRI-STATE FORESTRY CONFERENCE

A CONFERENCE of foresters of Indiana, Ohio and Illinois held at Indianapolis on October 22 and 23, and very well attended, developed particularly valuable discussion on national and state forest policies. Resolutions were adopted demanding public and legislative action to assure a permanent timber supply. Others were as follows:

Resolved, That a system of taxation on timberlands be adopted which will discourage premature and wasteful cutting and encourage forest renewal. Be it

Resolved, That the states should greatly increase their forest holdings by the purchase of young second-growth and land

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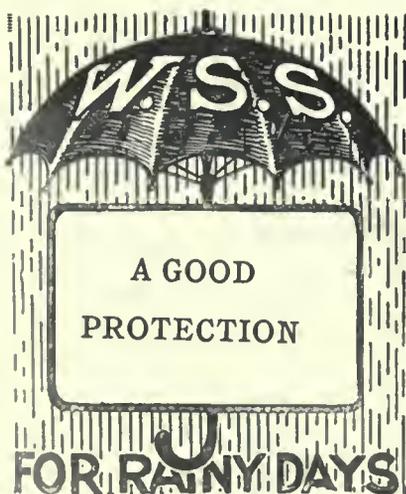
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adapted to reforestation made possible by a bond issue of 50 to 100 years maturity so the burden may be equally distributed through generations. Urging that large holdings by the states will present a steady and permanent source of supply which will stabilize timber prices

Resolved, That this Conference urges upon our representatives in the Congress, the necessity for largely increased appropriations under the purchase clause of the Weeks Act, to extend the area of national forests, and particularly into the hardwood regions of West Virginia, Kentucky and Tennessee, from which the tree states concerned already draw a large portion of their hardwood supply.

Be it further urged, that the Federal Congress appropriate adequate funds for co-operation with the states in forestry, as it is doing in road building, agricultural extension, vocational education and other activities, with the especial object of encouraging farm forestry extension under the Smith-Lever Act, reforestation of idle lands and protection against fire. Be it

Resolved, That the states launch an extensive and thorough campaign through the press, the schools, the pulpit and mails, to arouse the public to the need of a state forest policy and necessity of action toward the assurance of a permanent timber supply.

It is furthermore urged, that forestry education should be made a progressive part of the public school curriculum.

THE WEEKS LAW POLICY

REPRESENTATIVE Zebulon Weaver has introduced a bill (H. R. 10372) into Congress asking for an appropriation of two million dollars a year for the next five years "to be expended under the act of March 1, 1911" (the Weeks Law), for the purchase of forest lands in the White Mountains of New England and the Southern Appalachians, with the avowed purpose of protecting the headwaters of our larger streams.

This is not a new policy, but is a continuation of a policy endorsed by Congress a number of times. The purchases began in 1911 with an appropriation of two million dollars a year for five years. As three million dollars of this was allowed to lapse, it was re-appropriated by Congress two or three years ago. Last year this policy was again endorsed, but only \$600,000 was appropriated, owing to the exceptional conditions due to the war.

The demand is now being made to put this policy on a more business-like basis by again making the expenditures cover a period of years. This has two very distinct advantages. It allows the government to compete with other possible purchasers, by allowing them to know that they will have a definite amount to spend for the next several years. It also enables the Forest Service, which is engaged in the

acquisition of the lands, to maintain a very much more effective and permanent organization of experts who are already trained in the various activities connected with purchasing.

THE SECOND SOUTHERN FORESTRY CONGRESS

THE second meeting of the Southern Forestry Congress will be held in New Orleans, Louisiana, Wednesday, Thursday and Friday, January 28, 29 and 30, 1920. It will be recalled that the first Congress was held in Asheville, North Carolina, three years ago.

It is planned to devote the first day of this meeting to a discussion of the needs of the South for forestry, with special reference to the timberland policy for privately owned lands now being proposed by the Federal Government. The United States Forester, Colonel Henry S. Graves, is expected to be present to give the views of the Forest Service on this important question, while leading men in other lines will be asked to present the subject from the points of view of the State, the lumberman and the local landowner.

On the second day a more general program will be carried out, consisting of discussions upon such subjects as the acquisition by the Federal Government of forest lands for the production of timber, as well as for the protection of streams; state forestry organizations and policies; forest fire prevention; the relation of grazing to timber production on non-agricultural lands; the future of the naval stores industry, etc. The program for the third day has not yet been outlined, but it will probably be given over to sectional meetings, or to field excursions, or both. There will be fewer set speeches than is usual at such meetings, because it is planned to develop free discussion amongst the delegates in attendance. The various forestry and lumbering associations, landowners' associations and manufacturers' associations interested in timber production and in the proper development of Southern lands are being asked to co-operate in this meeting, which it is expected will be one of the most important ever held in the South.

Colonel Joseph Hyde Pratt, Director of the North Carolina Geological and Economic Survey, Chapel Hill, N. C., is now president of the Congress, and Mr. J. S. Holmes, State Forester, Chapel Hill, is secretary. Mr. R. D. Forbes, Superintendent of Forestry, Louisiana Department of Conservation, New Orleans, has kindly consented to act as assistant secretary, and will attend to all local arrangements. It is hoped that all the Southern States will be fully represented at this Congress.

NEW FIRM OF FORESTERS

WILLIAM L. HALL has resigned his position as Assistant Forester in the United States Forest Service to head the

firm of Hall, Kellogg & Company, with offices in the Otis Building, Chicago. The firm is to deal in timberlands and forest products, make forest surveys and to develop timberland investments. Mr. Hall was with the Forest Service for twenty years. His first undertaking was the formation and organization of a definite plan for timber planting operations for the Government and assistance to private owners who desired to grow timber. After putting this work upon a sound and practical basis, Mr. Hall was next asked to develop the branch of Forest Production in the Forest Service, with which he was connected for a long time and during which period the present widely known researches and investigations in timber testing, timber treating, and pulp and paper making were planned and culminated in the establishment of the Forest Products Laboratory at Madison, Wisconsin. For the past eight years Mr. Hall's energy has been devoted to the examination and recommendation for purchase by the National Government of 1,700,000 acres of timber and cut-over land in the White Mountains and Southern Appalachians, during which time he has gained an experience in timber examination, land classification, the handling of complicated land titles and the blocking up of holdings into suitable units for administration that is of a particularly unique and valuable character. During the war Mr. Hall was assigned to a conspicuous part in organization of the 20th Engineers, and at the close was a major in training for overseas service. Recently he has been making a survey of the wood-using industries of the Middle West for the purpose of determining their supply of raw material and the development of plans for a national forest policy, including the necessary part to be played therein by the Government, the timberland owners and the Public.

R. S. Kellogg, the other principal member of the firm, also began his professional and business career in the Forest Service, entering that organization in 1901 and continuing until 1910. During this period he had many important assignments covering all parts of the United States and Alaska. He made numerous forestry investigations in various parts of the country and brought out a large number of important publications. He had an exceedingly important part in the early conservation movement which focused the attention of the whole country upon the necessity of conserving supplies of timber and other natural resources. To Mr. Kellogg's efforts are due the plan of collecting annual statistics of forest products. The work was originally instituted by him and he wrote many of the earlier reports published by the Forest Service and the Bureau of the Census.

In 1910 Mr. Kellogg left a promising career in the public service to become Secretary of the Northern Hemlock and Hardwood Manufacturers' Association. Later

he became Secretary of the National Lumber Manufacturers' Association, and in 1918, Secretary-Treasurer of the Newsprint Service Bureau, with offices in New York. He will retain this position, his association with the new firm being in the capacity of stockholder and director.

VERSATILITY OF WOOD

A PAIR of green silken sox woven from fine fibers made from spruce and a coil of stout binder twine spun from twisted strands of fir are two of the typical products of western woods displayed on a panel just received in the office of the West Coast Lumbermen's Association in Seattle from the Forest Products laboratory at Madison, Wisconsin.

The exhibit has been arranged as a demonstration of the practical results obtained through the research work at the Madison laboratory and merely goes to illustrate once more and to emphasize that sawn and finished lumber is the crudest commercial product of the trees.

Among the other interesting specimen products included in the exhibit are: furniture reed and braid, used in making "wicker" furniture; paper rug yarn, extensively used in making bath-room mats and small household rugs; linoleum, with attractive patterns, made from wood flour and linseed oil; paper bagging that can be used in place of the jute bags now commonly employed in sacking grain; paper absorbent, which was quite generally used during the war as a successful substitute for absorbent cotton; artificial lath, produced from a mixture of wood flour and used as a substitute for wood lath; basket braid, made from twisted strands of paper; insulating rods and tubes, binder twine, paper cloth, glue tissue wrapping twine, paper webbing and rope, all produced from paper which in turn has been produced from native wood.

The basis for products such as phonograph records, insulating tubes and artificial lath is wood flour, which consists of spruce wood chemically treated and ground into a fine powder. The versatility of this flour is demonstrated by the fact that it is used in the peaceful art of making toys as well as in the more violent purpose of manufacturing dynamite. A case containing gunpowder made from wood flour is included in the exhibit.

Manufacture of clothing from artificial silk, produced from spruce, presents wonderful possibilities. The pair of sox on display is a mere example. A strip of silken cloth, tied with a silken cord—all made from spruce—show what can be done in this direction.

ODOR AND TASTE OF WOOD

MOST of our native woods are without pronounced odor or taste, but woods of the laurel family, of which sassafras and California laurel or myrtle are representatives, have a distinct spicy odor and taste.

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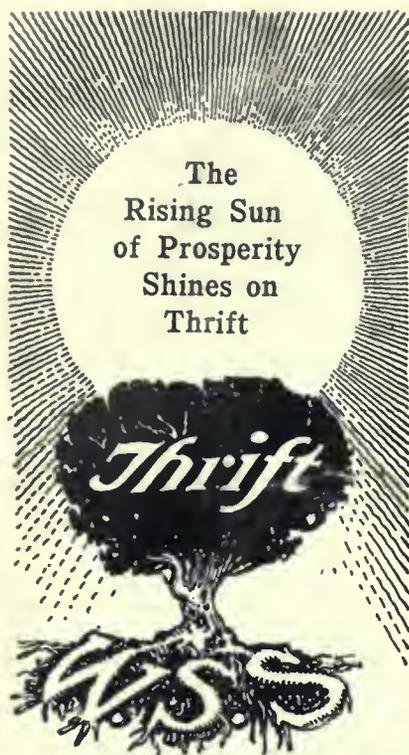
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Port Orford cedar of the Pacific coast has a very spicy, resinous odor; other cedars have a more aromatic odor, especially the pencil cedar or juniper. Hemlock has a slightly sour odor while cypress is somewhat rancid. Except in cedars and junipers these odors are scarcely strong enough to taint food unless it is brought into direct contact with the wood as in butter tubs or boxes. For wooden pie plates, butter dishes, bowls, buckets, candy pails, kegs and barrels, only woods are used which are without taste.

FOREST FIRE AIR PATROL

DISTRICT 5, of the United States Forest Service, reported the following interesting data on the forest fire patrol, via the air, for the two months of July and August: 745 flights, 92,605 miles of flight, 8 planes daily in service, 16,000,000 acres national forest land covered twice daily, 5,000,000 acres private timber covered twice daily, 6 forced landings, 1 fatality.

In addition to the above terse figures, the District Forester reports the system as 85 per cent efficient in discovery of fires, but amends this by stating that it will shortly be practically 100 per cent efficient. Equipping the planes with wireless telephones will largely assist in reaching this state of perfection.



FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, Care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, Care American Forestry Magazine, Washington, D. C. (1-3)

Man to be discharged from the Army September 30th desires position in forestry work, with lumber or railroad company or assisting in investigations of utilization of wood products. Would accept position in other work. Is married man, graduate of Michigan Agricultural College, 1913. Has had experience in orchard work, clearing land, improvement cuttings, planting and care of nursery, pine and hardwood transplants, orchards and larger trees, grading and construction of gravel roads, and other improvement work. Has executive ability and gets good results from men. Please address Box 860, care of American Forestry Magazine, Washington, D. C. (9-11)

POSITION wanted by technically trained Forester; college graduate, 37 years of age and married. Have had seven years' experience in the National Forests of Oregon, California, Washington and Alaska. Also some European training. At present employed on timber surveys as chief of party in the Forest Service. Desire to make a change and will be glad to consider position as Forester on private estate, or as city Forester. Will also consider position as Asst. Superintendent of State Park and Game Preserve in addition to that of Forester. Can furnish the best of references. Address Box 820, care American Forestry Magazine, Washington, D. C.

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

WANTED—Position as Forester and Land Agent. Technically trained forester, 35 years old. Practical experience along all lines included under the duties of the above positions. Former Captain, Field Artillery. Address Box 840, care American Forestry, Washington, D. C.

WANTED—Position with Lumber Company or Private Concern by technically trained Forester with five years practical experience. Box 820, care American Forestry.

A FORESTRY graduate with several years experience in forest work and at present employed along technical and administrative lines desires responsible position with private concern operating in and outside the United States. Address Box 870, care of American Forestry Magazine, Washington, D. C.

A CHRISTMAS SUGGESTION

Are you puzzled about the selection of Christmas gifts?

Why not give a year's subscribing membership in the American Forestry Association as a gift. It will cost you \$3.00, and the member will receive American Forestry Magazine for a year.

This will be an ideal Christmas gift for a child or an adult.

Send the money to the Association and a Christmas Card will be sent you to present on Christmas Day.

DISSTON SAWS

Building Service in Saws

For eighty years, Disstons have been leaders in the art and science of saw-making—have, as a matter of fact, invented and developed much of the saw-making machinery in use in their plant today.

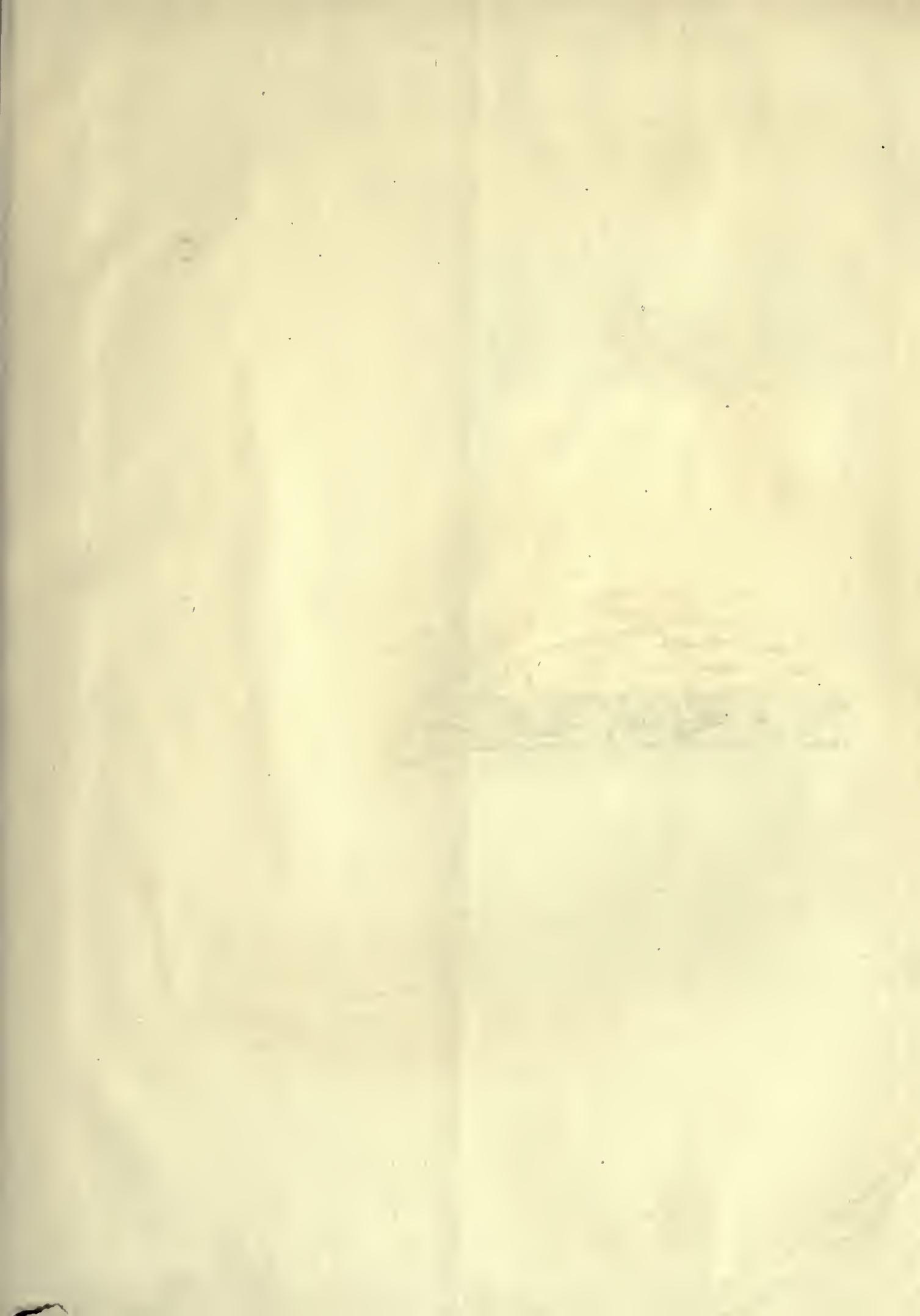
No plant in the world is more rigidly ruled by the laws that compel painstaking care and exactness than the House of Disston.

It is only natural, therefore, that Disston Saws are accepted, all over the world, as standard in quality and service.

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