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SALUTE TO THE TREES

BY HENRY VAN DYKE

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Many a tree is found in the wood
And every tree for its use is good:
Some for the strength of the gnarled root,
Some for the sweetness of flower or fruit;
Some for shelter against the storm,
And some to keep the hearth-stone warm

Their roots are the nurses of rivers in birth
Their leaves are alive with the breath of
the earth;
They shelter the dwellings of man; and
they bend
O'er his grave with the look of a loving
friend.



Some for the roof, and some for the beam,
And some for a boat to breast the stream;-
In the wealth of the wood since the world
began

The trees have offered their gifts to man.

But the glory of trees is more than their
gifts:

'Tis a beautiful wonder of life that lifts
From a wrinkled seed in an earth-bound
clod,

A column, an arch in the temple of God,
A pillar of power, a dome of delight,
A shrine of song, and a joy of sight!

I have camped in the whispering forest of
pines,

I have slept in the shadow of olives and vines;
In the knees of an oak, at the foot of a palm
I have found good rest and slumber's balm.

And now, when the morning gilds the
boughs

Of the vaulted elm at the door of my house,
I open the window and make salute:

"God bless thy branches and feed thy root!
Thou hast lived before, live after me,
Thou ancient, friendly, faithful tree."

DEAR SIR: YOU HAVE MY CORDIAL CONSENT TO REPRINT THE POEM
IN "AMERICAN FORESTRY." HERE'S A VERY POOR PICTURE OF MY
GUARDIAN TREE. DO YOU WONDER I LOVE IT?

YOURS SINCERELY,

"AVALON," MAY 17, 1921.

HENRY VAN DYKE.

AMERICAN FORESTRY

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EDITORIAL

BUSINESS INVESTIGATES FORESTRY

ONE of the most distinctive steps in the forward advance of forestry in this country is the decision of the Chamber of Commerce of the United States, composed of the best and clearest thinking element of American business, to thoroughly investigate the question of a National Forest policy through the medium of a special committee appointed and delegated for this purpose.

This movement was initiated on January 25 last by the Board of Directors of the United States Chamber of Commerce, which voted to name a committee of wide representation, composed not only of men of attainment in fields closely associated with forestry, but business men and others prominent in varied walks of life.

This committee, before it makes its report, will have investigated the forestry situation at first hand by holding conferences in New York and Chicago, and by a close-hand survey of the forest regions, particularly on the West Coast.

The desire of the Chamber of Commerce is to have an absolutely impartial committee carefully investigate the forestry problems of this country, and after studying the situation from every angle decide whether and in what form a referendum shall be submitted to the Board of Directors. If a referendum is approved by the Board it will be submitted to about 2,000 member organizations for discussion and ballot.

The American Forestry Association has been honored by having two members of its Board of Directors selected to serve on this committee, and it awaits with great interest the result of the Committee's investigation and the decision both by the Board of Directors and the member organizations.

This is the first time American business, which participated so effectively and widely in the successful consummation of the Great War, has interested itself in forestry as one of the great problems of national welfare and economy.

PRIVATE FORESTRY AND TAXES

ONE of the industries of the United States dependent upon the forest is the manufacture of paper.

Although the paper industry of the country, whose product last year was valued at over the billion dollar mark, uses less than four per cent of the wood cut of the nation, its continued existence is absolutely dependent upon the maintenance of its supply of raw material.

It is for this reason that one of the most valiant advocates of the Snell-McCormick forestry measures is the American Paper and Pulp Association.

The importance of the forest problem to the printing, paper and allied industries is not appreciated by those who use the product of the forest in this form. The New York State supply of pulpwood timber, for instance, would not last the mills in that State five years, were they to be deprived of the supply which they receive from across the international boundary.

In the West are vast supplies of pulpwood timber, but the long rail haul makes them almost prohibitive to the paper mills of the eastern portion of the country. The development of paper mills in the Far West is a big future possibility; but even then the rail haul to eastern consumers would be so expensive that the competition of Eu-

ropean paper, made under conditions of cheap labor, subsidized industry, and for the present at least of impaired European currency, would become a serious problem for the industry.

It is absolutely imperative, therefore, that the waste lands of the east should begin, and begin now, to produce forests for future use. If the United States paper mills are to exist, therefore, in independence of foreign raw materials, the utilization of forest areas to produce the needed raw material is a paramount necessity.

And yet, only a few months ago, a prominent paper manufacturer, a believer in forestry, with a firm intention of using a big tract of forest land under the most approved forest regulations, found that the taxation laws alone of his State would force him to abandon this plan of keeping his land productive with forest crops. He found that the laws of his State imposed on such timberland a tax equivalent to taxing a crop of grain twice a week during the growing season. His hope of maintaining his forest land in forest growth by cutting only the mature timber was almost shattered. Had he been a man of ordinary persistence only, he would have abandoned hope entirely and proceeded to slash off every tree on his land, in order to avoid paying ruinous taxes.

And this situation is not confined to the paper industry. Those who wish to practice forestry find that the same public which calls the lumberman a devastator of the forest frequently forces him to cut his timber on account of excessive annual taxes.

Despite such handicaps, however, the paper industry has continued to practice, as well as to preach, forestry, and more and more paper companies are establishing forestry departments to maintain their supplies of raw material.

The paper industry, merely given here as an example of other American wood using industries, is on the horns of a dilemma. If its timber is cut, its future existence is imperiled; if it tries to conserve its timber, the State places a ruinous tax on what is not cut.

Without relief, without raw material, America must seriously consider the loss to foreign manufacturers of at least a portion of an industry whose product valued at over a billion dollars in 1920, gave employment to over 110,000 workers in more than 1,100 mills.

WHAT TEXAS NEEDS

TEXAS is striving to secure a law which provides its people with forests and lumber for their future needs. W. Goodrich Jones, president of the Texas Forestry Association, has issued an appeal to the people of the State in which he says:

"The State should compel the millmen to leave seed trees, as the land will naturally reforest if fires and hogs are kept from destroying the seedling growth. This more especially in the long leaf district. Deal justly with the millmen and buy their cut-over lands, at least 60 per cent of which are unfit for cultivation. A law should be passed allowing the State to condemn these lands at their actual values. Inaugurate a great State Forest as thirteen other States have done. Follow the plan of Louisiana with a severance or production tax on lumber. This at 12½c per 1,000 feet will furnish the State with a sufficient sum for a small beginning. This severance tax is in reality a consumer's tax, yet the added cost, \$2.50 for a

20,000-foot bill will make the burden on the small home builder negligible. This association introduced such a bill in the last Legislature, and it was defeated, thanks to the lumbermen. Just why the Texas lumbermen oppose this tax, which they will pay only as agents, and the Louisiana lumbermen favor it, is hard to understand. Probably the Texas lumbermen are opposed to a State grown and owned crop, raised for the benefit of all the people. The question now before the people of Texas is, shall a few hundred lumbermen rule and ruin Texas? Shall a small body of men block legislation, desired for the benefit of 5,000,000 people?"

What will be done is up to Governor Neff, and the State Legislature which assembles during July. The people of the State are aroused, they are demanding adequate forestry laws, and if the members of the Legislature truly represent the people who elected them they will give full consideration to the forestry bill.

A STATE FORESTRY PROGRAM

THE Oklahoma State Forestry Association has just been organized and it is interesting to note that, after a study of other state associations and the work which they have undertaken, Oklahoma has decided that the purpose and principles of its association are to promote economic forestry, farm forestry, park forestry, city forestry and tree planting in all their aspects in the State, such as:

Protection to woodlands and woodlots from fire, insects, etc.

Protection to shade trees along the public ways, in towns and cities.

Co-operation with lumber and woodworking industries, timber and woodlot owners.

Tree planting in western Oklahoma on farmsteads, along highways, in towns and cities.

Conservation of forests on areas not suited for agriculture and planting of trees on non-agricultural lands.

Conservation of fish and game, song and migratory birds.

Establishing national, state, county and city forests and parks.

Conservation of our native landscape; places and objects of historic interest and importance.

Procuring a state forestry policy and the necessary forestry and park legislation.

Supporting the greater United States forest policy and co-operating with the United States Forest Service.

This is a comprehensive program and one which will keep the new association busy—but it can be carried on successfully, and the State will benefit materially if it is.

PENNSYLVANIA'S GOOD EXAMPLE

THE United States has been set a good example by Pennsylvania, which has recently increased the salary of the Commissioner of Forestry from \$5,000 to \$8,000 a year, and that of the Deputy Commissioner from \$3,600 to \$6,000. Such salaries naturally not only attract good men to important positions, but keep them. Salaries paid by the government to the men of the United States Forest Service are, as in other government departments, entirely inadequate. As a result nearly one-third

of the trained foresters in the department seek and secure other jobs every year. Aside from the fact that the salaries are not fair payment for the work is the fact that the operation of the Forest Service is severely hampered by the loss of men trained to do its work and by the necessity of spending time to train other men, a goodly proportion of whom are certain to seek other work about the time they become really valuable to the Forest Service.

FOR THE GOOD OF THE FOREST

IF a forest is kept at its highest productive capacity, practically all other ends will be attained. In the various discussions leading to policy and legislation this basic fact is at times overlooked. For convenience separation is sometimes made into timber forests, protection forests and other broad classes; but if the prime end of maximum wood production is kept in mind the forest as such will be conserved and its greatest usefulness assured.

This thought is especially pertinent now when so much is heard about devastation, the reclaiming of denuded areas, and the perpetuation of forest growth on cut-over lands. It applies with equal force to the Adirondack and Catskill Forests of New York, where the protection of water supply and recreation are given as reasons for keeping state lands immune from cutting, and to the private holdings of the South and West, where public welfare requires the growing of successive timber crops on lands unsuited for agriculture.

The fire protection essential to any of these ends calls for concerted action by both public and private interests; but the responsibility for succeeding or related steps is not so clear. Between the theories of Federal and State control and the advocacy of voluntary or compulsory forest production on private land some middle ground will be found, involving, it is to be hoped, an adjustment and correlation of the several interests concerned.

The disturbing question is where the money is to come from now and during the growing period. In the ultimate settlement, the public will pay the bill, whether the growing trees are financed with Federal, State or private capital. It follows, then, that maximum wood production, of desirable kind in the shortest time, will yield the best return on the investment. For a long time investment must be made, not only as a future safeguard against timber scarcity, but in an economic sense in the use of capital for long periods.

There is plenty of timber for today; it is tomorrow's supply which is at stake. The underlying economic basis for all forestry agitation is the production of timber for posterity on the reasonable assumption that the nation will need wood for all time to come. As a scientific axiom it is equally apparent that if forests are protected and maintained for wood production they will at the same time serve the various other purposes for which their value is recognized.

In the more direct application of this, it is apparent that protection forests, such as are advocated, for example, in parts of the Adirondacks, need not be limited to the one use which would prevent the state from deriving a revenue from these areas. Any cutting should, of course, be done under very careful regulation and supervision, but starting with the present over-mature forests, which are making little if any net gain in wood volume because of slow growth and loss from decay, the first step would be the replacement of the old growth as far as feasible with better and more rapid growing trees. With this accomplished

the upper slopes of primary value for protection purposes would be managed so as to prevent denudation and erosion; but at the same time utilize the timber crop as it matures. Ample precedent for this is found in mountain forest areas in Europe.

On both public and private lands wherever located and where the protection feature is not of importance, the prime aim and object is to maintain a timber forest. The recreation and game features are incidental, but are attained as a matter of course. With fire protection, nature largely assumes the task of reforesting lands from which mature timber has been removed, and while in some regions the natural reproductive capacity may not create a new forest of the highest production nor of the most desirable kind, only a relatively small amount of help is needed to establish and maintain a productive forest. The greatest public interest—for the future—may call for the reforesting of the waste lands now entirely denuded or for forest planting where satisfactory natural seedling does not follow cutting, but while forest policies are in the making and public sentiment is being crystallized, the first and obvious step is to protect what we already have, encourage natural forest growth in every way possible, and gradually as funds and machinery become available increase the productivity of existing forest lands while gradually bringing new areas under forest cover.

In whatever is done in creating public sentiment and in passing legislation, it is important that facts not fallacies be promulgated. With all the good intentions in the world the word "devastation" has been made a publicity feature, yet without interpretation and explanation its meaning may be entirely misunderstood. If it is devastation to cut a tree or a forest of trees, it is not clear how a supply of lumber, pulpwood and other forest products is to be obtained, and these are the things the public now wants at low cost. If the good of the forest requires the replacement of the over-mature stands with faster growing and more desirable species, the removal and utilization of these old trees constitute devastation both to the eye and as regards their complete removal. When these terms are aimed at the lumbermen, as is usually the case, misconception is created if only one side of the story is told, and the broad and involved commercial factors ignored. Equally fallacious is the popular idea of solving the whole forest problem by planting two or three trees for every one which is cut. Forestry as an art and science must be applied with intelligence and in accordance with physical conditions which vary not only by regions, but almost property by property. The whole subject is too big and too involved to be dismissed or solved with a few slogans and scare headlines, or by legislation which does not fully take into account the complex factors of the situation. The starting point is protection, followed by rational steps for the highest productivity in the forests we have.

THE WHITE PINE

BY J. S. ILLICK

THE white pine stands out pre-eminently among the many forest trees native to eastern North America. Its discovery dates back to the day the Pilgrims landed on the rocky coast of New England. It was probably the first green thing that they saw as they approached the rough and rugged shores of the New World. Seeing

into the unbroken forest which then seemed endless and inexhaustible. In those days there seemed to be no end to the range of the white pine and the supply was thought to be so great that it would last forever.

Many years passed before the entire range of the white pine became known. But as the pioneers pushed forward they found that this valuable timber tree has limits of distribution. And now we know definitely that it is found only in the eastern part of the United States, extending northward as far as Newfoundland, and the northern shore of the gulf of the St. Lawrence, westward to Manitoba and Minnesota, and southward to Northern Illinois and Pennsylvania and along the Alleghenies to Georgia. The real extent of its wide range may be appreciated better by stating that it is native along a North and South line of 1,800 miles and an East and West line of 1,200 miles.

The merits of the white pine became so well known that at an early date it was planted beyond the limits of its natural range. In 1705 it was introduced into England



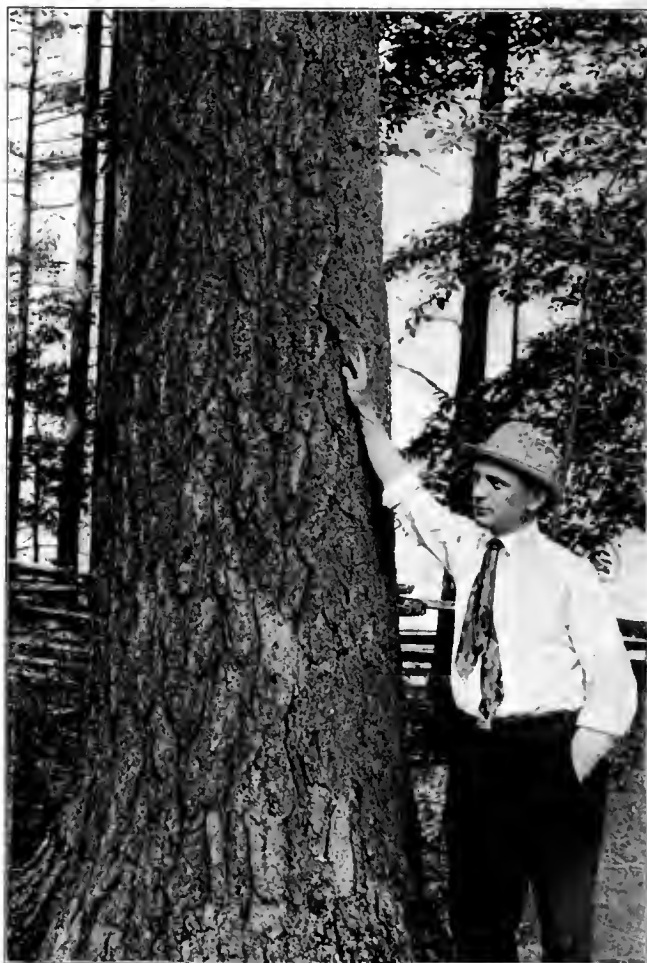
THIS IS THE FOREST PRIMEVAL

The original stands of White Pine in Northern Pennsylvania were among the densest and heaviest east of Idaho.

such beautiful and stately trees immediately upon landing must have given cheer and comfort to this little band of daring and tired sea voyagers.

It did not take the early settlers long to find out that this beautiful tree produces excellent wood and that it is adapted to a wide range of uses. As early as 1623 sawmills began manufacturing white pine lumber, and in 1635 a cargo was shipped to England from Massachusetts. It was not long until the demand for white pine lumber became so strong at home and abroad that sawmills sprang up everywhere.

The lumbermen of colonial days had many hardships to endure, and it must have been comforting to them to find that the white pine stands became denser and the quality of the wood better the farther they penetrated



THE BARK OF A VETERAN WHITE PINE

This large trunk shows clearly the characteristics of the bark of the species, roughened by deep up and down fissures. It is dark gray in color.

by Lord Weymouth and shortly thereafter it was planted in Germany. In 1794 a Hessian forester visited America. He was impressed with the white pine, and took back with him a supply of seed sufficient to reforest 15 acres of woodland near Trippstadt, in Bavaria. The experiment was a success, and in 1910, when the writer visited the

Germany. Two-year-old seedlings were planted in 1855, and now the stand has 295 trees per acre averaging 85 feet in height and about 15 inches in diameter. This is one of the most attractive stands of white pine in the world. It is the pride of the forester in charge of the City Forest, and is visited annually by thousands of tourists and many foresters. In the Municipal Forest of Heidelberg, white pine covers more than 140 acres. There are at least 150,000 trees growing in this small City Forest, and throughout continental Europe many million trees have been planted. In fact, it has been planted so extensively that it is now regarded as a naturalized member of their forests.

Many good things have been said about the white pine, and I am wondering if we really know this excellent tree. I am sure no other native forest tree is known more widely or has a longer list of friends; but lest there may be one person among us who may not be acquainted with this princely pine, its striking distinguishing characteristics will be set forth.

The white pine can be identified without much effort. Most of its features are markedly distinctive from all other forest trees. It is the only evergreen tree native to eastern North America that has its soft, flexible, and bluish-green needles arranged in clusters of five. If one examines the needles of an eastern evergreen tree and



A BIG WHITE PINE

Only a few of the mighty monarchs of the original forest remain to tell of a former glory.

trees, they were all thrifty in appearance and some of them had attained a height of more than 100 feet, and a diameter of 25 to 35 inches.

These immigrant white pine trees began to bear fertile seeds at the age of 25 years. In their prime they produced a large quantity of select seed. All the seed produced by these trees was collected and sowed in forest tree nurseries for the purpose of reforestation. The most interesting part of this commendable accomplishment is the fact that some of the seedlings, raised from these American white pine trees grown in Germany, were brought back to America and used to reforest some of our own devastated forest land. All this happened in the early days of American forestry, before the forest tree nurseries of the United States were developed far enough to supply our own needs.

An excellent stand of white pine is also found in the Municipal Forest of Frankfort, located near Isenburg, in



SECTION OF WHITE PINE BEDS IN TREE NURSERY AT CLEARFIELD, PENNSYLVANIA

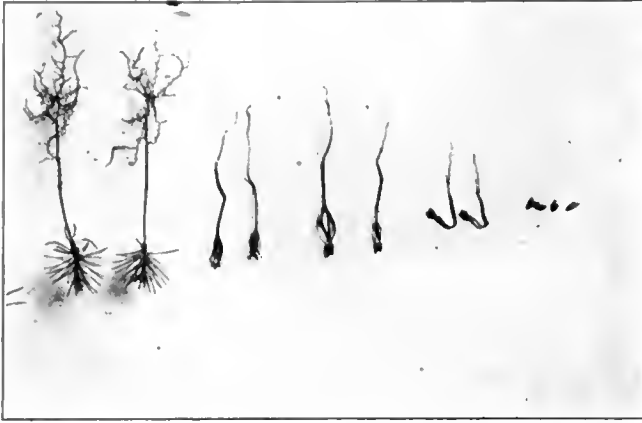
The nurseries operated by the Pennsylvania Department of Forestry have been yielding annually as many as three million white pine seedlings.

finds that they occur in bundles of five and are surrounded at the base with a thin paper-like wrapper the tree is unquestionably white pine.

But one should not be satisfied to identify any tree on the basis of a single characteristic, however striking it may be. A number of distinctive features should always be used.

Another helpful distinguishing characteristic is the arrangement of the lateral branches. They appear in hori-

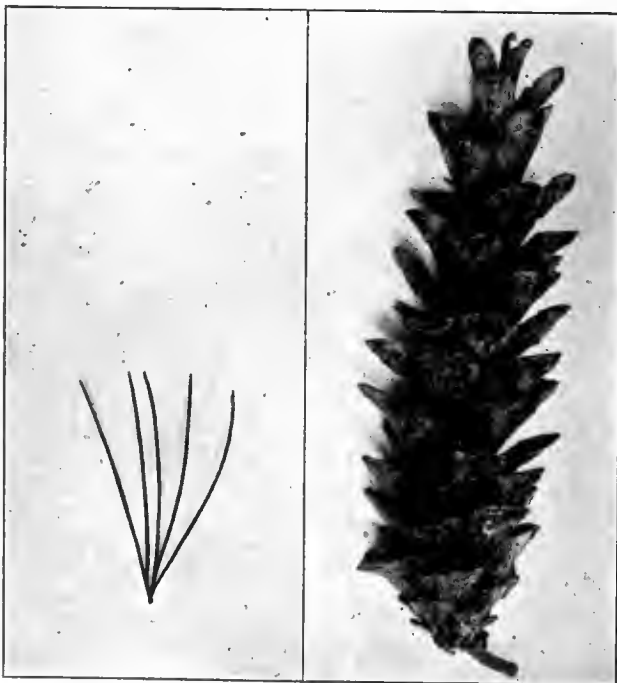
zontal layers or whorls, that is, from three to seven or more side branches originate about the main stem at a given point and the space between successive layers is free from lateral branches. After the lateral branches fall off they leave distinct circles of branch traces at rather regular intervals along the trunk, which may remain evident for 25 years or more.



FIVE STEPS IN THE DEVELOPMENT OF A WHITE PINE SEEDLING

From the seed to a one-year-old seedling. The seed coat may persist for several weeks after the tiny seedling pushes its way through the soil. A one-year-old seedling is only about one and one-half inches high and bears solitary needles. The needles do not appear in clusters of five until the second year.

The fruit of the white pine is a cone. When full grown it is from 5 to 10 inches long and covered with numerous thin flat scales. At the base of each scale two winged seeds are produced. The seeds are brown in color and small in size. It takes from 25,000 to 35,000 separate seeds to make a pound of clean seed, which is



A CLUSTER OF NEEDLES AND A CONE

White pine needles come in bunches of five and the cone is very beautiful, being when full grown from 5 to 10 inches in length.



DISTINGUISHING CHARACTERISTICS ARE HERE VERY PLAINLY SHOWN

A twig of white Pine bearing immature and mature leaves in bundles of 5 each, and a cluster of staminate flowers.

sufficient to sow 100 square feet of nursery bed, and if all goes well each nursery bed will produce from 10,000 to 15,000 two-year-old seedlings.

The bark is also a helpful means of identification. On the twigs it is smooth and greenish-brown; but on the older branches it is light to dark brown and scaly. On large trunks the bark is dark gray and roughened by deep fissures which extend up and down along the stem.

The wood is soft, straight-grained, and works easily. It weighs about 25 pounds per cubic foot, and was formerly used for a wider range of purposes than any other American wood. White pine wood has stood out especially as a building material. In the early days only the choicest material was used. Houses may be found today which were built years ago and covered with weatherboards in which not a single knot can be found in the whole house. Only the best was used then. Now we are obliged to take any grade and pay a high price for it.

The form of the white pine varies with its environment. If grown in dense stands such as prevailed in the original forests, the stems will be straight and taper gradually, and the lateral branches are found only in the shallow crown, often a hundred or more feet above the ground. But if the white pine grows in the open with plenty of space and sunlight on all sides, the crown will resemble a pyramid in form and extend almost to the ground. The lateral branches will persist for many years unless they



A THRIFTY STAND OF PLANTED WHITE PINE

Trees are 48 years old. Circles of branch scars are clearly shown. The distance between two scars is one year's growth. This stand is in the City Forest of Frankfurt, Germany.

are shaded out by neighboring trees. In this respect it is different from many of the other eastern pines. In a field near Mont Alto, Franklin county, Pennsylvania, stand two pine trees which contrast strongly with each other. The one is a white pine and the other is a short-leaf pine. From all the available evidence these two trees grew up in the same environment, and yet they have few features in common. The white pine has a pyramid-like crown with the lateral branches persisting almost to the ground, and a strong-tapering stem, while the short-leaf pine has a shallow round-topped crown and a long, clean, and slightly tapering stem. These two trees, standing only about 50 feet apart, offer the best object lesson in tree heredity that ever came to the attention of the writer. To have developed forms so different from each other in the same environment and at the same age can hardly be attributed to anything other than the fact that each has inherited its own distinctive form. This belief is supported by many recent scientific experiments which have proven that tree characteristics can be handed down through the seeds from one tree generation to another.

For many years white pine was the nucleus of the American lumber in-

dustry. Even as late as 1890 almost one-third of the annual lumber cut of the entire country was white pine. But at the rate it was being cut there was no hope that it could retain a first-class place, for the supply was too small. Today only a few remnant patches of original white pine remain; that is, the kind that the white man found when he began to exploit the forests of the New World. Even in Pennsylvania, where once stood some of the best white pine in the world, only a few scattered patches remain. These veteran trees are becoming so rare that pilgrimages are now taken annually to the remote places where a few of these forest monarchs still stand.

But there is a ray of hope for the white pine. It is unquestionably the most important forest tree in eastern North America, and probably in the world. It adapts itself to a great variety of soils, grows rapidly, produces valuable wood, and is attractive in appearance throughout the entire year. Because of these merits special efforts are being put forth to bring

back again to its former position of importance.

Throughout the range of white pine there occurs many natural young stands of it. Special efforts are being put forth by many states and private owners to protect these



THE OLDEST PLANTATION OF WHITE PINE ON THE STATE FORESTS OF PENNSYLVANIA

It contains more than 2,000 trees, and complete growth records are kept of every tree on a selected sample plot containing more than 200 trees. Each tree is numbered and the white horizontal line below the number of each tree indicates the breast-high mark, where diameter measurements are always taken.

promising young stands against forest fires, injurious insects and destructive fungi. Much good work has already been done along these lines, and as a stronger sentiment develops in favor of real constructive forestry work, the white pine will gradually work its way back to the place it deserves, and make our barren hillsides look green, and then there will flow forth from them a continuous supply of much needed wood.



A WHITE PINE STUMP FENCE

Many stretches of such fence are found throughout the country. Though this may be considered by some as the extreme in utilization it goes to prove that every bit of a white pine is good.

During the past two decades the practice of forest tree planting has established itself in America. Twenty years ago very few forest trees were being planted. Now they are being set out by the millions, and many thanks are due the good judgment of the foresters who have placed white pine at the head of the list. The growth and the ultimate significance of the practice of forest tree planting may be appreciated by studying the following table which gives the number of white pine trees planted on the State Forests of Pennsylvania from 1902 to 1919 inclusive:

Year.	Number of Forest Trees Planted on State Forests of Pennsylvania.
1902.....	5,000
1903.....	1,600
1904.....	3,000
1905.....	25,000
1906.....	85,700
1907.....	25,000
1908.....	70,800
1909.....	588,375
1910.....	777,289
1911.....	1,407,304
1912.....	1,335,247
1913.....	2,536,595
1914.....	2,494,252
1915.....	2,173,235
1916.....	3,343,400
1917.....	1,602,560
1918.....	2,935,250
1919.....	1,262,365
Total.....	20,671,972

of forest land in Pennsylvania. Most of the planting stock was supplied by the Pennsylvania Department of Forestry. And in other states, particularly New York, Massachusetts and Connecticut, many million young white pine trees have been planted on barren waste land.

Many of the trees comprising the older plantations have already reached a size of 20 to 30 feet in height. The growth during the first few years is rather slow, but each successive year it becomes greater until the annual height growth reaches two to three feet, and in exceptional cases it may be as high as four feet in a single season. The following table will give the height growth of an ordinary plantation during the first 10 years after its establishment:

Year.	Age of Trees (years)	Current Growth (inches)	Total Height (inches)
1909.....	3.....	2.5.....	5.0
1910.....	4.....	6.3.....	11.3
1911.....	5.....	7.7.....	19.0
1912.....	6.....	9.1.....	28.1
1913.....	7.....	10.4.....	38.5
1914.....	8.....	15.4.....	53.9
1915.....	9.....	22.1.....	76.0
1916.....	10.....	27.3.....	103.3
1917.....	11.....	30.2.....	133.5
1918.....	12.....	33.1.....	166.6

Many of these planted baby trees were set out by school boys and girls. The Boy Scouts have taken an active part in the tree planting work wherever it has been called to their attention. Tree planting by boys and girls should be encouraged everywhere. It is a pleasant pastime, and also a useful and helpful practice.

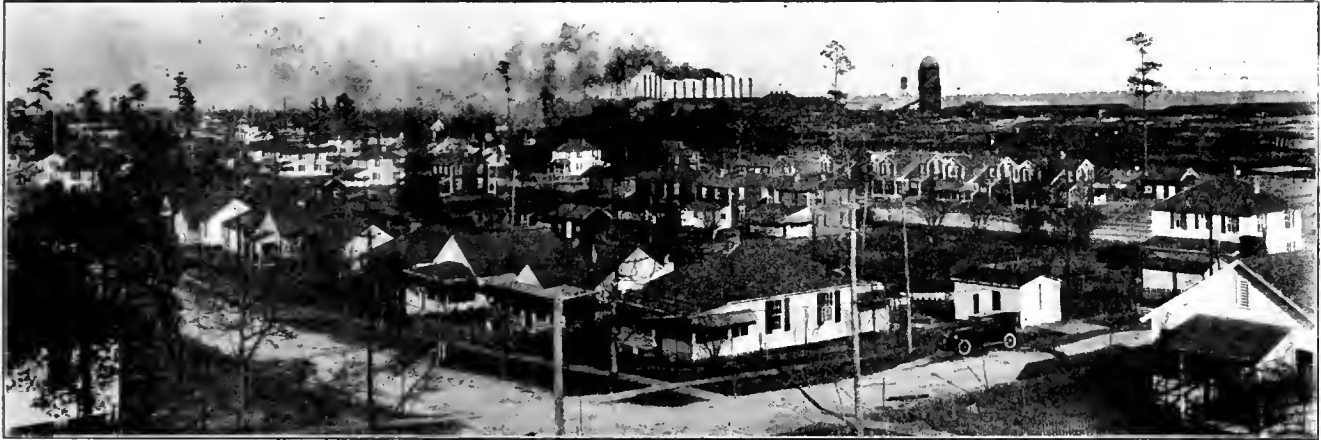
At first it may seem incredible that more than 20 million white pine trees have been planted in 18 years on the State Forests of Pennsylvania; that is, an average of more than one million per year. This does not represent the total planting for other kinds of trees have also been set out on many idle acres of State Forest land. In addition to the State Forest planting at least 10 million white pine trees have been planted by private owners

REFORESTATION THAT WILL PAY DIVIDENDS

BY ARTHUR NEWTON PACK

THERE is hardly a newspaper or magazine in the country that has not at some time or other in the last year or so proclaimed the rapid depletion of our timber resources. We are told that if the present rate of consumption continues without the creation, through reforestation, of vast new sources of supply, within the lifetime of a child born today we will have only great treeless wastes to contemplate, the lumber and paper industries

One of the largest manufacturers of wood products announces that it has now *permanently* established itself in Louisiana. It will never again cut out the last of its timber and pull up stakes in the old way to follow the ever-receding forest, because through reforestation its own supply is to be made inexhaustible. In common with most other lumber manufacturers, the management of this company once looked askance on the idea of reforest-



LOCATION OF THE REFORESTATION PROJECT

This is a view of Bogatusa, Louisiana, showing in the distance the plant of the Great Southern Lumber Company, which is a pioneer in the application of reforestation by lumber companies, and expects to grow enough trees to supply its needs forever.

will be dead, and wood the most high priced of all building materials. The remedy is there; but who is willing to apply it?

Federal and State governments can and will expend great sums of money for example and encouragement; private individuals may undertake smaller projects; but every year our wood-using industries continue to denude an acreage about as large as the State of Massachusetts, and the situation can be but little improved. Ultimately it must be those great industries themselves, which, with an awakened consciousness of the emergency confronting them, and with the cooperation of public opinion as well as governmental agencies, will meet the issue.

ation. Their hope was to build up, co-incident with the lumber industry, a great agricultural center based on the cut-over lands, which, when the mill had done its work, was to give profitable occupation to all. After several years of experimenting, however, it was evident that the returns were hardly sufficient to form the basis of industrial permanency. It was then that the natural re-growth of certain cut-over sections began to direct their attention to the idea of reforestation, and the new policy was the result. Instead of the usual group of ugly unpainted shacks, this company has built a handsome town, each building a model of its kind. Y. M. C. A., Y. W. C. A., hospital, hotel, offices, parks, schools and homes are



THE RESEEDING CREW AT WORK

By fostering instead of hindering natural propagation the company plans to eliminate the necessity of artificial reseedling.



GETTING THE SEED

The pine cones are dried in the manner shown in the photograph in order to obtain the seed. The company now has about 1300 pounds of seed on hand.

hardly to be equalled in a city of a hundred thousand people. It all represents faith in just one idea—that sane and practical reforestation can be made to pay dividends.

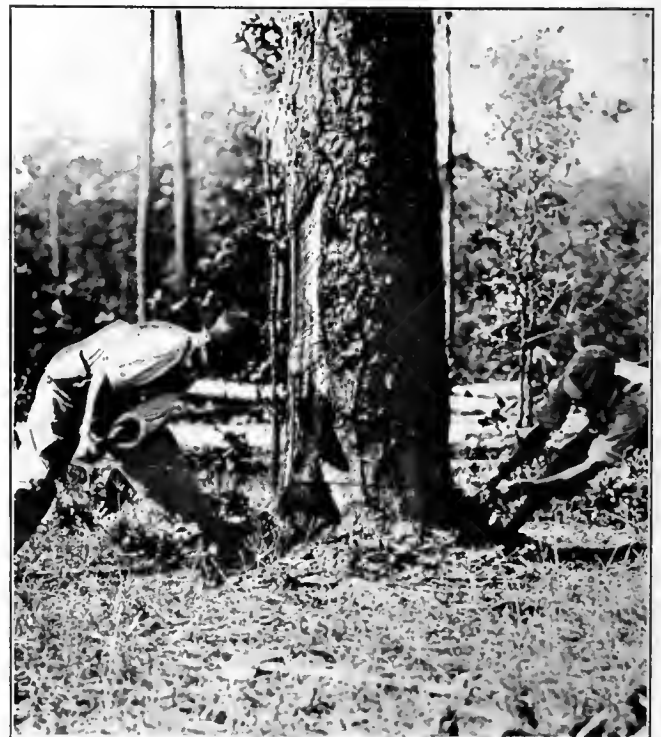
The problem of growing timber is perhaps more simple in the south than in certain other parts of the country. Given a chance Nature seems to generously attend to the re-seeding, and the loblolly, or old field pine, indigenous to that section, is one of the most rapid growing of all species. Although taking about five times as long to reach maturity, the long leaf pine, which for many years has been the standard wood for construction purposes throughout most of the United States, also reproduces freely.

The chief obstacle has been fire. In this well-settled community the careless match has been responsible for the destruction of many millions of seedlings every year. Even people who profess to understand the principles of forestry have claimed that a burning over of the land immediately after the timber is cut is one of the best means of promoting reforestation. For the pine of the south this is emphatically untrue, and although a few seedlings may survive the first burning, the majority are destroyed. The dangerous season in southern Louisiana is during the winter months, for there is no snowfall, and as soon as the first frost nips the long grass which everywhere covers the forest floor, it becomes a most inflammable tinder ready to flare up at the slightest spark. Plowed fire lanes dividing the tracts into the smallest

possible units within a reasonable limit of expense, have been used with success, and this company is to supplement this with watch-towers, where a man will be continually on duty.

The present town site of Bogalusa, Louisiana, was entirely cut over about 14 years ago. Where repeated grass fires have burned through there is practically no reproduction, but in many places naturally protected a splendid second growth of loblolly may be observed. For one such group the Forestry Department has carefully counted, measured and numbered every tree, and keeps a record of annual growth as a check for its own estimates. Last year a few of these trees were cut and manufactured into paper pulp as a proof of the practicability of the reforestation idea. Doubtless it would have paid better to have left these trees four or five years longer, but in this case the company merely desired to illustrate its contention.

Many natives of the long-leaf pine country claim that an area timbered with long-leaf will not come up a second time to the same species, but only to the short-leaf varieties. The Louisiana State Forestry Department some time ago demonstrated the falsity of this theory and explained the reason. Every settler in that country, be he white or black, keeps a varying number of hogs. The chances are he does not know himself how many, for the State is without a stock law and stock of all kinds are allowed to range about through the unfenced woods and cut-over lands. The long-leaf seedling devotes the first year or so of its life chiefly to growing roots, and the long tap-root with its heavy sugar content is a favorite tit-bit for these range hogs. A few hungry hogs will pretty effectually kill the one or two year old long-leaf stand on a



CLOSE UTILIZATION

The up-to-date lumberman economizes by having his lumber cut as close to the ground as possible. This is real forest conservation.

tremendous acreage, in order to eat the sweet root. They will not harm short-leaf seedlings, because they do not like its roots.

The company has carefully fenced in against the hogs nearly five thousand acres of land, upon most of which the 1920 seed-fall is growing, this being the first large scale work of the kind ever attempted in this country. Fencing is an expensive operation, but the company has been willing to experiment along this line because of its faith in the potential value of the investment.

In spite of these protective measures it is realized that no new development can successfully take place until a large majority of the people are educated to appreciate its value. The company's department of forestry has made it a principal part of its work to conduct a thorough and continuous publicity for the education of the local population to the importance and value of a permanent timber supply. This has been carried on in an excellent common sense way — not only through the local papers, posted signs and special appeals, but through interesting exhibits of forest products at the country fairs. According to present plans the company will have a forest values display at every fair

in the State this year. Last year people crowded to these forestry booths to see the exhibits and search for their friends among the photographs of farmers who had already taken steps to plant or conserve the young timber growth on their land. In addition, the company last year advertised widely that it would purchase at \$5.00 a cord

such wood as the farmers wished to cut from their own lands and deliver at the railroad. Although the company could have procured from its own logging and sawmill waste sufficient raw material for its pulp mill, five thousand additional cords were thus purchased for the sake of educating the people to the value of wood. It is possible that much of the success which will attend this educational work will be due to the special efforts of the Chief Forester, for he himself was born and bred not far from the present town and the personal equation is always important

in obtaining good will. Where it appears that, due to the interference of man's agency, the cut-over land has not been properly re-seeded, the company has experimented with various methods of sowing pine seed. The best way has not yet been determined. On 2,000 acres of land long-leaf pine seed was broadcasted last fall, but



FOREST ENEMIES

These hogs feed on the sweet roots of young second growth long-leaf pine and have to be kept off land where re-growth is desired.



FROM THIS WILL GROW NEW FORESTS

Bags full of long-leaf yellow pine seed gathered by the Great Southern Lumber Company and being used in replanting cut-over areas where man's devastation has made it impossible for Nature to provide.

without very satisfactory results. About a pound of seed was scattered over each acre; but Nature's own methods are more lavish than man can afford, and it is probable that as the seed was scattered at a time when other food for the birds was scarce, the feathered flock which followed the sowers probably profited most by the operation. On the other hand, 800 acres of fenced land were roughly plowed and then about six-tenths of a pound per acre of Long-leaf, Loblolly and Slash Pine seed was drilled into the soil. The results here are already evident, and the ground is well covered with fine little seedling trees of these species. Fair results have also been obtained where 34,000 Loblolly seedlings found in the woods under the mature trees were transplanted. These seedlings could not have lived under the shade of the dense tops; but about 70 per cent are now doing well on a 55-acre cut-over area. When it is considered that 50 mature trees to an acre constitute a fair stand, it is evident that even if over half the remainder die the experiment will still have proved a success. The labor of transplanting represented a cost of only about six mills per seedling tree. It is interesting to note that after advertising to buy pine seed at one to two dollars a pound without success, the company subsequently was able to collect its own seed from the heavy 1920 crop at a cost as low as fifty cents a pound.

It should be kept in mind that all these methods of artificial reforestation have been purely experimental, and the most practical ideas will be evolved through practice. The keynote of the whole plan is not to assist Nature, but so far as possible to remove the obstacles which man has placed in her way. The Forestry Department operates well ahead of the logging crew, plowing out its fire lines and watching to protect from enemies the millions of tiny seedlings in the soil. When the logging crews begin work, to be sure, more than half of these seedlings will be destroyed by the skidding of the logs, etc.; but Nature has provided for that through her lavishness. In case the seedlings already in the soil should not be sufficient, the forester also selects groups of young healthy seed trees, which he marks with a painted circle. These the logging foreman must protect from all bruising or injury. The seed tree idea is everywhere in its infancy, and most attempts along this line have frankly failed, because the forest tree is a community dweller. When left alone by the cutting of its neighbors it usually has but a short life, blown down by the first strong wind, or succumbing to the attack of some insect which has multiplied in the dead brush left behind by the loggers. The company thus tried leaving single selected seed trees without much success. The group idea is a comparatively new one, and only the next year or two can testify as to the success of the experiment.

The most expert advice from both State and National

sources has been obtained in the formulation of reforestation policies. As an example of thoroughgoing faith in the idea the company is now paying for an exhaustive soil analysis and survey of their land holdings, to determine just what portions are more chiefly suitable for agriculture and what land can best be reforested. The results of these earlier reforestation experiments will then be applied to the many thousands of additional acres so selected, and a really perpetual timber supply will be obtained. The re-growth of the town site has already demonstrated the practicability of this as far as the short-leaf species go; but the plan looks ahead even as far as 40 years, when the first replanted long-leaf pine will reach a merchantable size—a plan so far-reaching and revolutionary that it may in time succeed in changing the entire character of the lumber industry. It certainly seems worth a try.

Although the problem of reforestation may be generally regarded as the foundation of forestry, it is far from being the only question with which forestry deals. Effective utilization of timber is at least equally important. The ordinary lumber manufacturer uses only about 50 per cent of the tree. This company, with its subsidiary paper and by-product plants, leaves behind in the woods nothing but very low stumps and the smaller twigs and branches. Top and limbs, amounting to about a cord to every thousand feet of saw-logs, are separately collected, loaded and shipped to the pulp mill where they are successfully manufactured by the sulphate process into very heavy brown paper for "packing container liner". The present mill has a capacity of sixty tons of pulp a day. Its fuel is entirely obtained from the saw and planing mill refuse, chewed up by the "hog" into the consistency of very coarse sawdust. The company estimates that the cordwood obtained from tops and branches supplemented by sawmill waste will be sufficient for the manufacture of five hundred tons of pulp a day, over eight times the present capacity, and new plants are to be built to take care of this. One of the new finished products will be high-grade white book paper. No by-product is wasted, even the rosin and turps which rise to the surface of the cookers is saved and sold. Other by-products of the enterprise include lath, shingles, barrel staves and heads, boxes, railroad ties and turpentine. The conservation idea pervades the entire process, and each new method of utilizing waste has meant real profit to the owners.

This company, the Great Southern Lumber Company, of Bogalusa, Louisiana, is practically the pioneer of the United States in reforestation and thoroughgoing conservation methods. It has built for permanence through faith in that experiment. When that faith is justified and practical reforestation actually begins to pay dividends, we may cease to fear the exhaustion of our timber resources.

THE USES OF WOOD

WOOD IN GAMES AND SPORTS

BY HU MAXWELL

ACCORDING to available statistics, about twenty-five million feet of wood of thirty-two kinds are consumed yearly in this country by manufacturers of appliances and apparatus for games and sports. Several industries require much more wood than this one, and produce articles which, in the aggregate, sell for more money, but no one of all of them, with the possible exception of toys, affords as much enjoyment. In one direction, this industry surpasses toys as a producer of happiness; for toys concern children almost exclusively, while this concerns old, young, and middle-aged in the same way. Games are for the elderly as well as for the youthful.

The dividing line between toys on the one hand and the apparatus for sports and games on the other, need not be closely defined. One merges into the other and the place of some may be disputed. It is not the purpose of this article to draw any close distinctions or to insist upon questionable definitions. Many manufactured articles clearly belong here and doubtful ones need not be classified. The topics to be considered include tennis, golf, baseball, ski jumping, snow shoeing, bowling, archery, vaulting and billiards. It is proper to include hunting and fishing when engaged in for sport and not professionally. The limits of the field are indefinite.

The shaft or handle of a golf club represents one of the most exacting uses of wood. In this country hickory is employed in nearly all cases. It possesses the toughness and elasticity necessary, and it surpasses in these qualities any other known wood. In other countries, these shafts are sometimes made of

hornbeam, greenheart, and other foreign woods, but hickory has nothing to fear in competition with the best of them. The woods listed as sources of material in this industry consist of twenty-six hardwoods and six softwoods. Seven are foreign. The list of woods

follows:

Woods	Feet Used Annually
Hickory	4,944,000
Maple	4,913,815
Elm	3,226,750
Ash	3,180,000
Oak	2,497,559
Birch	933,233
Yellow poplar	970,200
Yellow pine	943,000
White pine	707,000
Basswood	318,000
Lignum-vitae	24,050
Chestnut	222,000
Beech	212,000
Persimmon	205,000
Spruce	191,000
Ebony	189,000
Hemlock	150,000
Cypress	136,000
Red gum	110,000
Mahogany	100,000
Douglas fir	85,000
Cottonwood	60,000
Black walnut	41,000
Spanish cedar	31,500
Sycamore	30,500
Circassian walnut	25,000
Rosewood	24,400
Tupelo	20,000
Teak	10,000
Dogwood	6,000
Holly	1,500
Cherry	600

Total 25,191,507

The manufacturers of golf shafts select their wood with infinite care, because much difference exists in the quality of hickory. It is not unusual for manufacturers to advertise that their product is "northern second growth hickory." That is a trade term rather than a scientific definition. Good hickory may be produced in the South as well as in the North; and "second growth," if it means anything, implies that the tree has grown in open ground, and has therefore, grown rapidly and consequently

has wide growth rings with plenty of dense wood. In one sense, every tree is of second growth if compared with its parent tree. Some people understand second growth to mean sprout or coppice growth, originating in stumps where other trees of the same species have been cut. So far as hickory is concerned, the wood of sprout trees is



A YEW TREE GOOD FOR ARCHERY BOWS

The American yew tree that furnishes the wood of which bows are made is found on the Pacific Coast. The accompanying photograph represents a tree in Oregon. It is this wood's elasticity and "nervousness" that gives it such great value as bow-wood. A fine yew bow sells for three times its weight in silver.



EQUIPMENT FOR A HUNTLER

The hunter prepares for game in the air, on the water, and on the land. Canoe and paddles are for water travel; a take-down rifle for large animals; a pistol for close quarters; specialized calls to decoy ducks, geese and cranes, and wood forms an essential part in all of these articles.

possess qualities much alike. In order to understand and appreciate these qualities, it is proper to compare them with other very strong, hard, and heavy woods.

Among the woods in this list, persimmon is unsurpassed in strength, hardness and weight. Dogwood falls a little below persimmon in some of these qualities, but rates above all other woods of the United States with few exceptions. The golf club must have weight in order to deliver the player's blow most effectively. It must have hardness and strength to withstand the impact.

Good tennis rackets require choice woods. Strength is furnished by the bentwood rim or bow, which is usually ash or hickory. Elm is serviceable but its appearance is not regarded

usually inferior to that from trees growing from nuts. The user of a hickory golf club handle is told many things regarding the growth and character of the wood, and some of the claims are more fiction than fact. The main point is that hickory is unsurpassed as golf shaft material, but it should not be forgotten that there are many grades and qualities of this wood.

The shaft is not the only wooden part of the golf club. The head is as important as the handle, but no more important. All handles are of wood, but some heads are metal, others of wood and some partly of ivory. The wooden head only falls within the scope of this article. Several woods are available, maple, birch, beech, lignum-vitae, dogwood, and persimmon. In this country the best heads are understood to be made of dogwood and persimmon. The head's contact with the balls, when the club is driven with all the force that a strong man can give it, tries severely the strength and toughness of wood. If it is not first class, it flies to splinters.

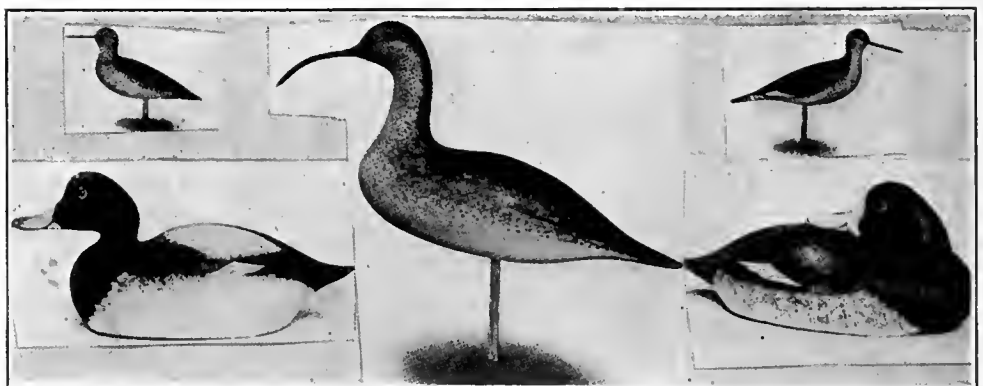
Dogwood and persimmon

as equal to that of hickory or ash, and appearance counts for much.

WEIGHT TABLE

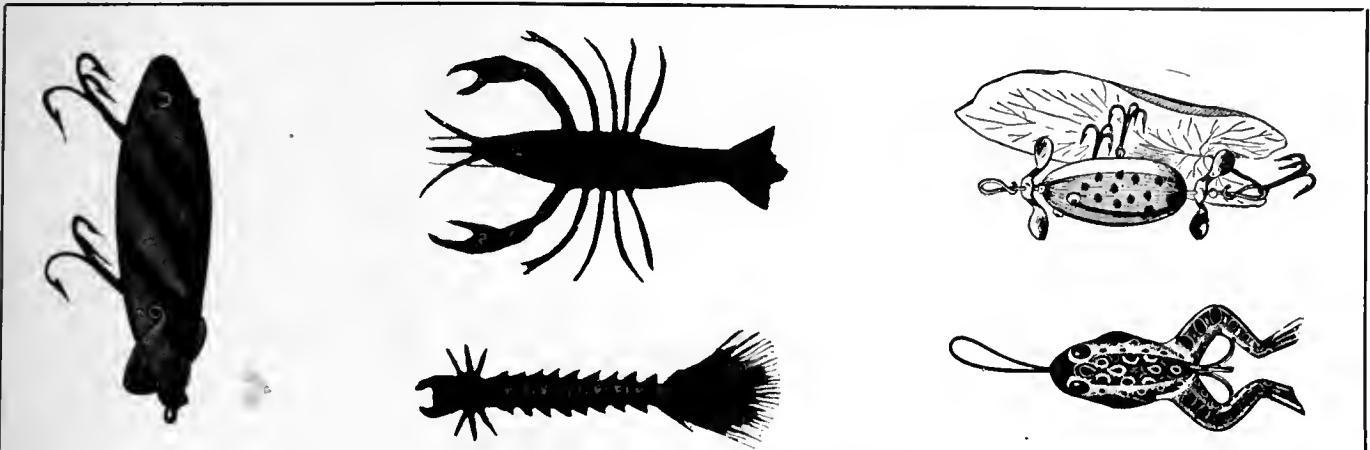
Wood	Strength	Hardness	Weight	Shrinkage, Per Cent of Green Bulk
Dogwood.....	17,300	2,530	52	19.9
Persimmon.....	23,700	3,180	53	18.3
Hornbeam.....	18,600	3,390	49	18.6
Shagbark.....	22,600	50	15.7
Beech.....	15,000	1,190	44	15.2

The rim affords an anchorage for the whangs or laces which form an essential part of the racket. The handle is of lighter wood, or frequently two woods appear in the handle, one of light color, one of dark, to give



WOODEN BIRDS EMPLOYED AS DECOYS

The hunter who bides his time till the open season arrives for water birds, depends upon decoys to lure the ducks, geese and cranes within range of his fowlingpiece. He expects to work from ambushes and concealment. Decoy birds are generally made of cedar wood, that being light and durable.



DIFFERENT PATTERNS OF WOODEN FISH BAIT

The same kind of red cedar that is used in making lead pencils is in use by manufacturers of artificial bait or lures for fish. A fish is stupid and is slow to suspect or detect a counterfeit. For that reason it is easily taken in by wooden minnows, beetles, crawfish, helgramites, frogs, and nearly everything else that crawls, swims, flies or wriggles.

pleasing contrast. The dark wood may be walnut, mahogany, cherry, rosewood, or Spanish cedar.

The remarkable differences in prices of tennis rackets are not so much due to the differences in the cost of the raw materials of which they are made as to the kind and amount of labor bestowed on their making. The best tennis rackets are works of art, and the skill of the worker is reflected in the price as much as in any other article belonging to sport and athletics.

The game of croquet does not develop experts and enthusiasts to the extent that golf and tennis do; but more people play it and more wood is consumed in providing the balls, mallets, and stakes than in the production of golf clubs and tennis rackets combined. The entire playing outfit of croquet is made of wood except the arches, and sometimes these are of bent wood. The

makers of croquet sets use more maple than any other wood; but the mallet heads of fine sets may be of lignum-vitae or teak; and the mallet handles may be of beech and birch as well as of maple. The balls wear

out sooner than the other parts of the outfit. They gradually go to pieces by splitting, a chip at a time.

One of the oldest games in America, in the playing of which wooden implements were used, is la crosse. It originated with Indians in prehistoric times and was widely known among the tribes of the northern United States and southern Canada at the time of the earliest exploration. The redmen called the game "baggatiway," but the French named it la crosse, which name it retains. It is not often played in the United States, but is popular in Canada and is played in most English-speaking countries. It partakes partly of the nature of



PARAPHERNALIA FOR TENNIS PLAYERS

The tennis racket is made of wood and raw hide, and several fine woods are commonly used in the production of the article. Ash, hickory, cedar and mahogany are in demand. Wood is not wholly essential in the construction of tennis courts, but posts and railings are often of wood.



THE COMPONENT PARTS OF GOLF CLUBS

The golf club stands high in the list of articles connected with sports, and it is essentially of wood, but, of course, some heads are of metal, though all handles or shafts are made of wood, for which no substitute has been found. Hickory is taken for the shafts and dogwood and persimmon for the heads.

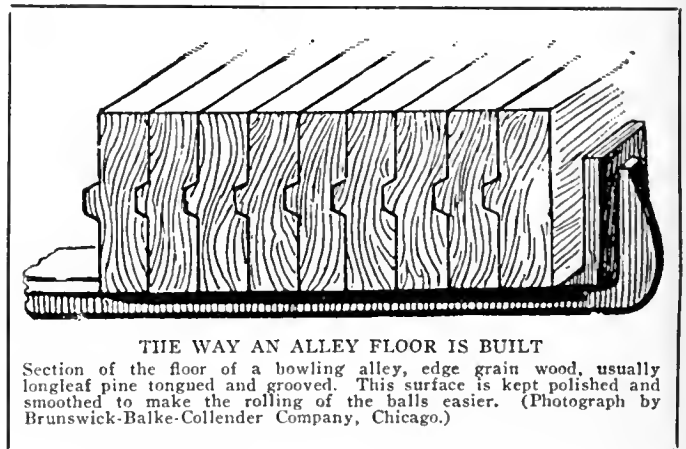
excited, yelling savages took part on either side and the field was half a mile long. The balls used now are of rubber, but the Indians in their early games employed balls hewed from knots of hickory, oak, ash, elm, black gum, and pitch pine. The balls weighed two or three pounds. In lieu of knots, the Indians used boulders the size of croquet balls. These missiles were hurled down the field from the nets at the ends

temis and partly of football. The wooden implement of the game is the stick or racket, four or five feet long, provided with a net for catching and throwing the ball.

It is not a very important game, judged by the amount of wood used and the number of people who play it; but it is of great historical interest. The stick is always made of hickory, and it is said that no Indian tribe played the game except those occupying regions where hickory grew or where it could be obtained. No other wood is considered sufficiently strong, tough, and resilient to stand the rough work of the game. The sticks have usually been made, and are still made, by Indians. The only factory is at Cornwall, Ontario, where a dozen or more Indians spend the winter whittling out the sticks. These Indians are the descendants of former generations of stick makers. Their work is rough and "home-made," but the sticks sell in England, New Zealand, Australia, South Africa, and Canada, as well as in the United States. A game was played every year by the students of the Indian School at Carlisle, Pennsylvania. The Indian makers claim that they alone possess the secret of the stick, and know how to curve it just right and hang the net in the proper manner.

The regulation game is now played by twenty-four persons, and it is conducted according to fixed rules, but it was a wild and furious affair as the Indians played it in early days. Hundreds of

of the sticks, and the force was such that players were frequently crippled or killed by being struck; but, in the



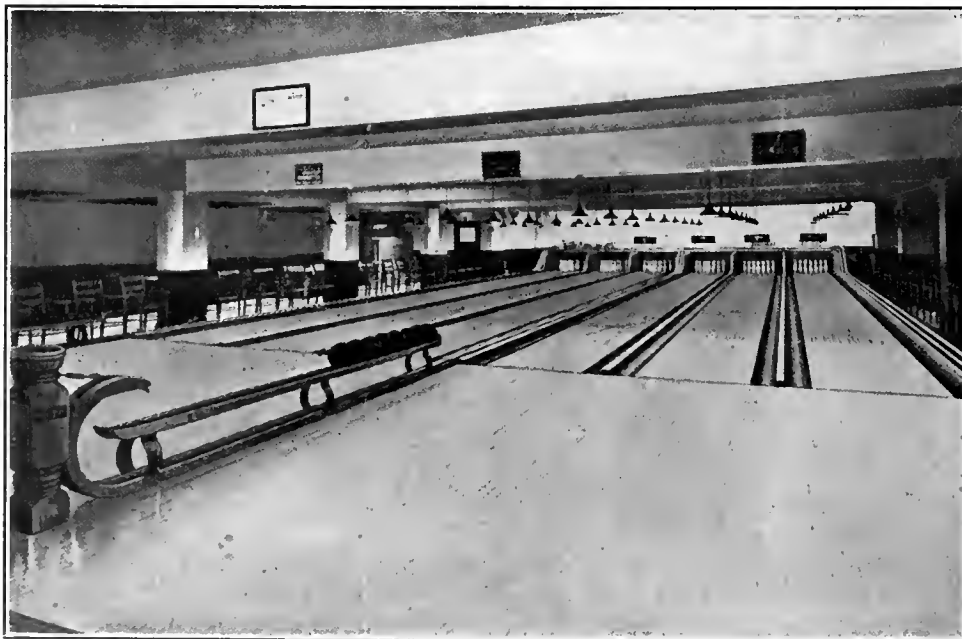
THE WAY AN ALLEY FLOOR IS BUILT

Section of the floor of a bowling alley, edge grain wood, usually longleaf pine tongued and grooved. This surface is kept polished and smoothed to make the rolling of the balls easier. (Photograph by Brunswick-Balke-Collender Company, Chicago.)

Indian's opinion, the game was not a success without a considerable casualty list. John Catlin gives an account

of a game in which six hundred Indians played at one time.

During the Pontiac War in 1763, the British fort at Mickillmacinac (near Macinac, Michigan) was captured by Indians through the stratagem of a la crosse game. The affair was staged in front of the fort by the Indians who pretended to be friendly. The rush for the



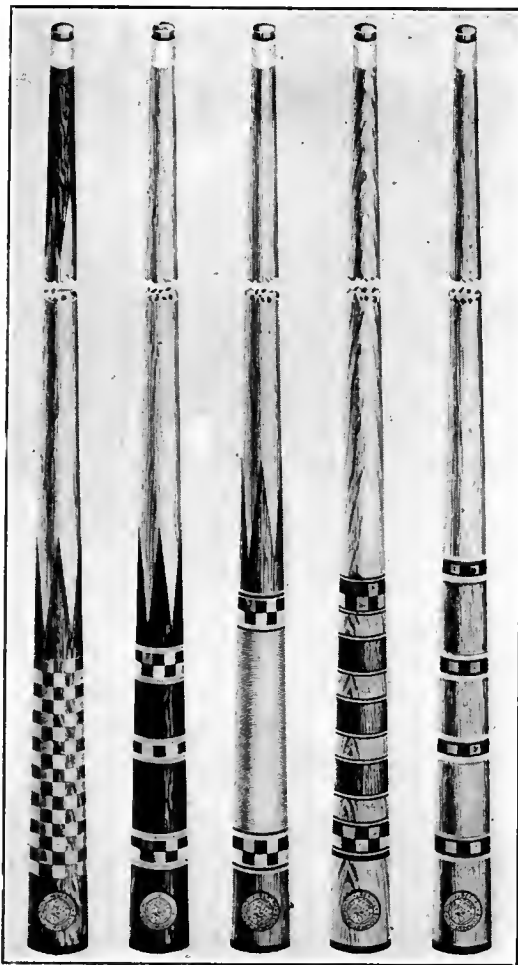
COMPLETE BOWLING ALLEYS

In the Illinois Athletic Club, Chicago. This is one of the finest alleys in the world and practically the whole construction is of wood, maple predominating. (The photograph by courtesy of the Brunswick-Balke-Collender Company, Chicago.)

ball suddenly developed, upon signal, into a rush through the gate of the fort, and the garrison was immediately massacred.

For the manufacture of baseball bats no substitute for wood has been found, and the many kinds tried have one by one been rejected till very few remain. Ash has won the leading place. Several qualities must be considered in selecting wood for bats, but the most essential are weight and strength. The shock and strain are severe at the moment of impact when the well aimed blow meets the flying ball in mid air and almost instantly stops it and sends it in the opposite direction. If the wood is not excellent, the blow shatters it. Ash stands better than any other wood that possesses the other necessary qualities.

The weight of the bat is important. The striking force is, to a large extent, in proportion to the weight, and ash seems to meet that requirement. The ordinary ball player may not be hypercritical of his bat. If it is fairly good, he uses it; but it is not so with the professional. He must have a bat made to order, precise in shape and



WOOD IN BILLIARD CUES

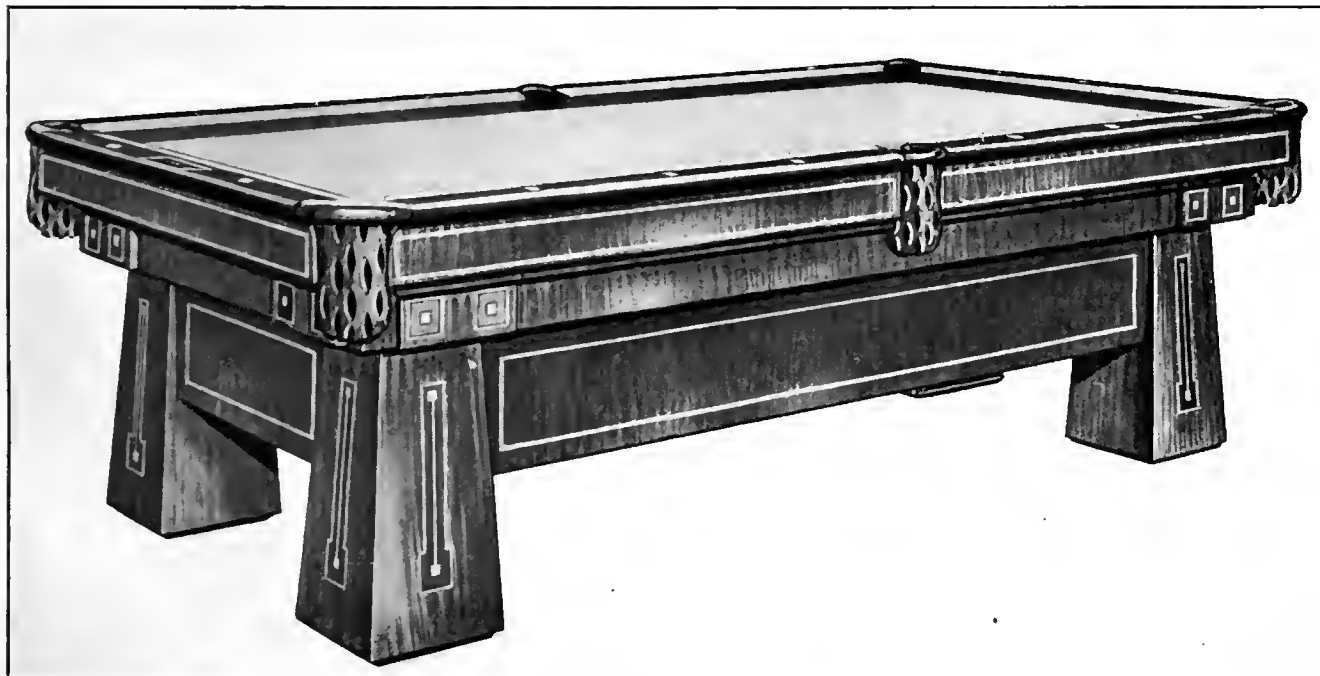
The wood worker does some of his best displaying on billiard cues, and it is not unusual to employ several kinds of woods, some of them finely colored species from foreign countries, such as chony, mahogany, padouk and box wood. (Photograph by courtesy of Albert Pick & Company)

weight, and of course it must be of a specified wood.

Woods other than ash are used for bats, for many players are not particular. Willow is very tough and it stands much rough treatment, and it has held its place. Small bats for boys may be of maple, birch, beech, elm, and many other woods.

Wood supplies the principal apparatus for playing a number of games where rolling balls have a part to perform. The bowling alley is well known. The specially-made floor of the alley is generally of maple or of longleaf pine. The balls are supposed to be made of lignum-vitae, and formerly nearly all of them were of that wood, but composition has been largely substituted for wood because it is cheaper. Lignum-vitae is regarded as the best wood for bowling balls. It possesses the requisite weight and is exceedingly hard and tough.

The pins which are set up to be knocked down by the impact of the balls are generally of maple. This wood is sufficiently hard to stand much pounding, and no other of equal cost is so satisfactory. Many games of

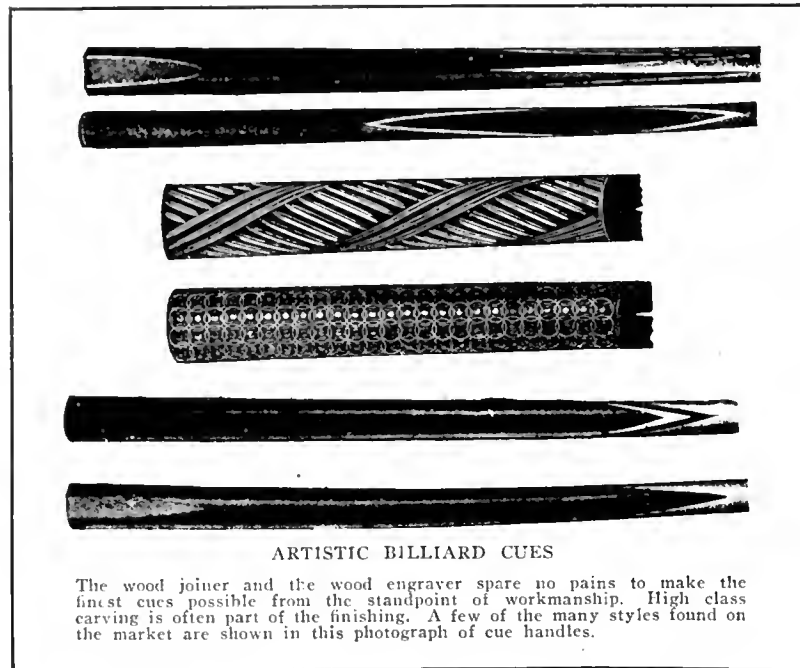


BILLIARD TABLE

Wood has no substitute in the manufacture of billiard tables. It is chosen not only for its beauty, but because well-seasoned wood holds its shape better than any other available material for this use. (Photograph by courtesy of Albert Pick & Company, Chicago.)

a similar kind are played, some with small balls and small pins. Wood's elasticity qualifies it for this use.

Billiard cues, racks, and apparatus require large quantities of wood in their manufacture. The billiard table might be considered as furniture except that it has a specific use which takes it out of the furniture class. The wood that goes into a fine dining or library table is equally acceptable to the maker of the billiard table, and among such woods are oak, mahogany, chestnut, yellow poplar, rosewood, cherry, walnut, and ebony.



ARTISTIC BILLIARD CUES

The wood joiner and the wood engraver spare no pains to make the finest cues possible from the standpoint of workmanship. High class carving is often part of the finishing. A few of the many styles found on the market are shown in this photograph of cue handles.

The cue is equal in place to the table, and the manufacturers of cues select their woods with great care and circumspection. The weight must be neither too little nor too large; and since the size is regulated by custom, the requisite weight is secured by selecting the wood that possesses it. Factors other than size and weight must be considered. The cue must have elasticity. It must start the ball upon its journey with the proper speed. That cannot be done by the player alone, no matter how skillful he may be. The cue is called upon to do its part.

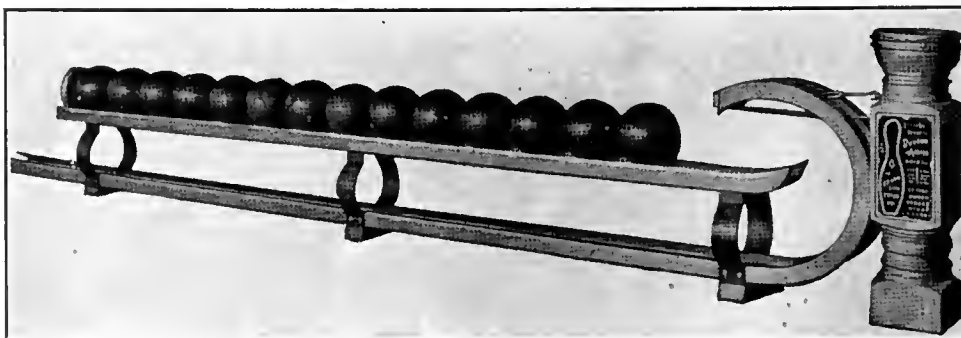
Maple is regarded as the best wood for cues. The article is often finely made, with maple as the main part but with inlays and insets of other woods, such as mahogany, padouk, walnut, rosewood, and ebony. The inlay is for the sake of appearance. The billiard cue maker is a large user of holly which

he colors black by dyeing. It then passes for ebony as inlay. Thus holly, the whitest wood, becomes an imitation of ebony, the blackest.

The triangle, within which the balls are placed on the table preparatory to beginning the game, is often of cherry. The buttons or tokens, strung on a wire and used for keeping tally of the game, are of paper-birch, maple, or of beech.

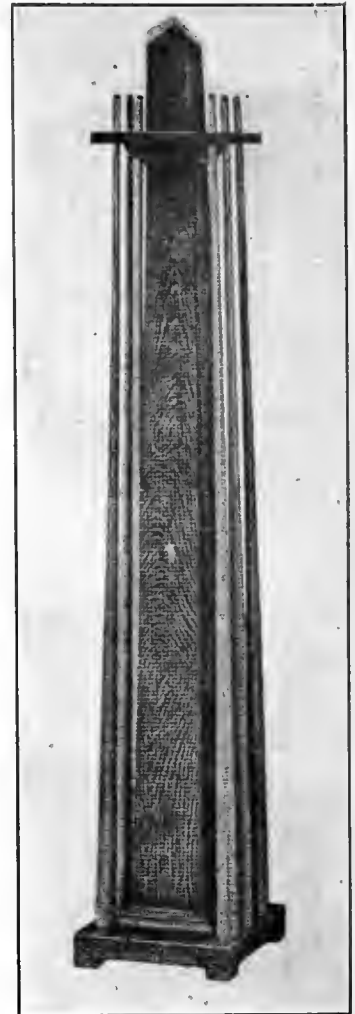
The gymnasium is largely equipped with wooden apparatus. The benches and horses may be any of dozens of woods, since particular qualities are not demanded; but

for some other parts of the equipment, selections are carefully made with the view of satisfying particular needs. Many woods will do for springboards, for it is the athlete's muscles, and not so much the wood that gives the jumper his send-off. Hickory, ash, and elm are suitable for the trapeze; the horizontal bars are of spruce, as are the vaulting poles, because spruce is among the strongest woods in proportion to its weight. Calisthenic rings are of hickory, and climbing poles are of yellow pine or some wood of similar quality.



A UNIQUE DEVICE FOR RETURNING BALLS.

A loop the loop return chute for billiard balls in an alley. It is made of wood and is an ingenious device to save time and the wear of balls. The balls return by gravity to the starting place. (Photograph by courtesy of Brunswick-Balke-Collender Company, Chicago.)



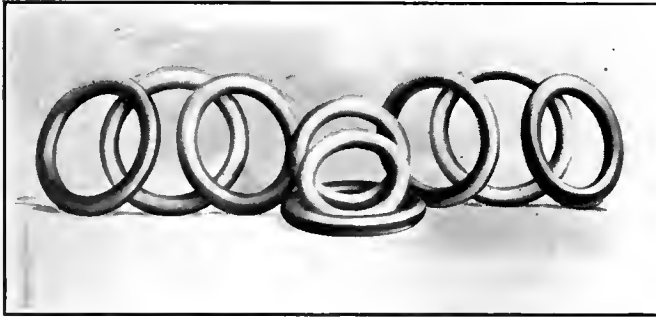
THE CUES AND THEIR STAND

Some of the finest woods grown in America, or brought to our shores, are manufactured into billiard cues. Not infrequently the same cue contains several kinds of wood, and they are often arranged to show contrasts in colors, such as ebony and holly, cherry and maple, and rosewood and walnut.

Indian clubs and dumb bells, which always fill prominent places in well appointed gymnasiums, are usually made of sugar maple, because it is heavy, takes a smooth polish, looks well, stands all the use and

abuse that is likely to be given it, and is not high in price. Many other woods are suitable, birch and beech among the best.

Boards are manufactured for special games, and so many are in use that a list would be tiresome. Some



WOODEN GYMNASIUM RINGS

Wood meets one of its most exacting uses when it serves as rings in the equipment of the athletic room. Very strong woods are wanted and at the same time they must present a handsome appearance if they come up to specifications. (Photograph by courtesy of J. B. Hellenberg Company, Coldwater, Michigan.)

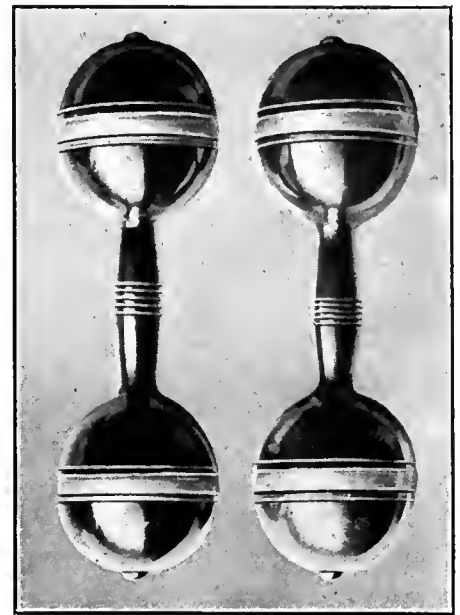
games are for children, others for those who have put away most childish things, but who still find amusement in certain games. Chess appeals to mature minds, and wood supplies most of the accoutrements with which it is played. Some of the best are of ebony and boxwood, but very satisfactory games may be played with yellow poplar, basswood, walnut, maple, and birch outfits. The same holds true of checkers, but that game usually is rated a little lower than chess in scientific points; though no less an authority than Edgar Allen Poe holds that as a mental exercise of the highest and purest sort, checkers surpass chess. Doubtless, very good players would hold different opinions as to that, depending upon personal training and preferences.

In athletics, sports, and games, the woods used in providing the equipment are no respecters of conditions and persons; for as interesting and scientific a game of check-

ers may be played by the local visitors at a cross-road's store on a rainy day, with the checker board penciled on the upturned bottom of a shoe box, as can be pulled off by experts in a club room with a ten dollar in-laid satinwood board. Wood in supplying the wherewithal for games, contributes to the enjoyment of high and low, rich and poor alike.

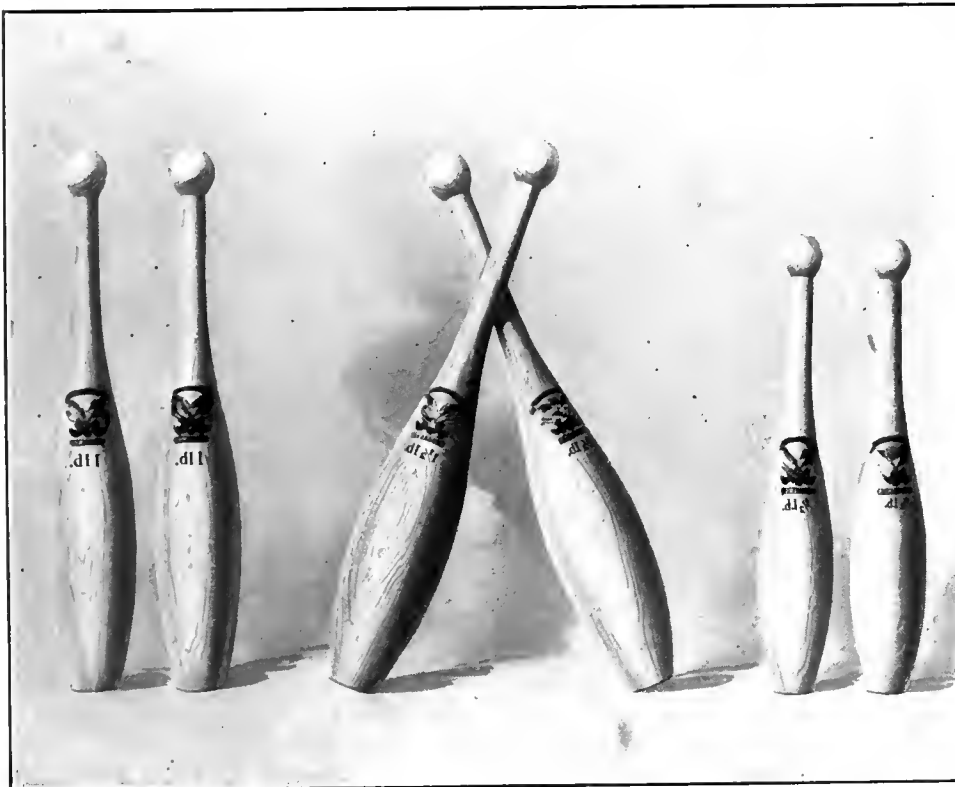
The principal sales of bows

and arrows are now made to archery clubs whose members shoot at targets. No large quantity of wood is required to supply the arrows and bows, but some of the wood is worked into highly specialized products. Ash, hickory and western yew furnish the bow wood, and the arrows are of numerous woods. The highest priced



WOODEN DUMB BELLS

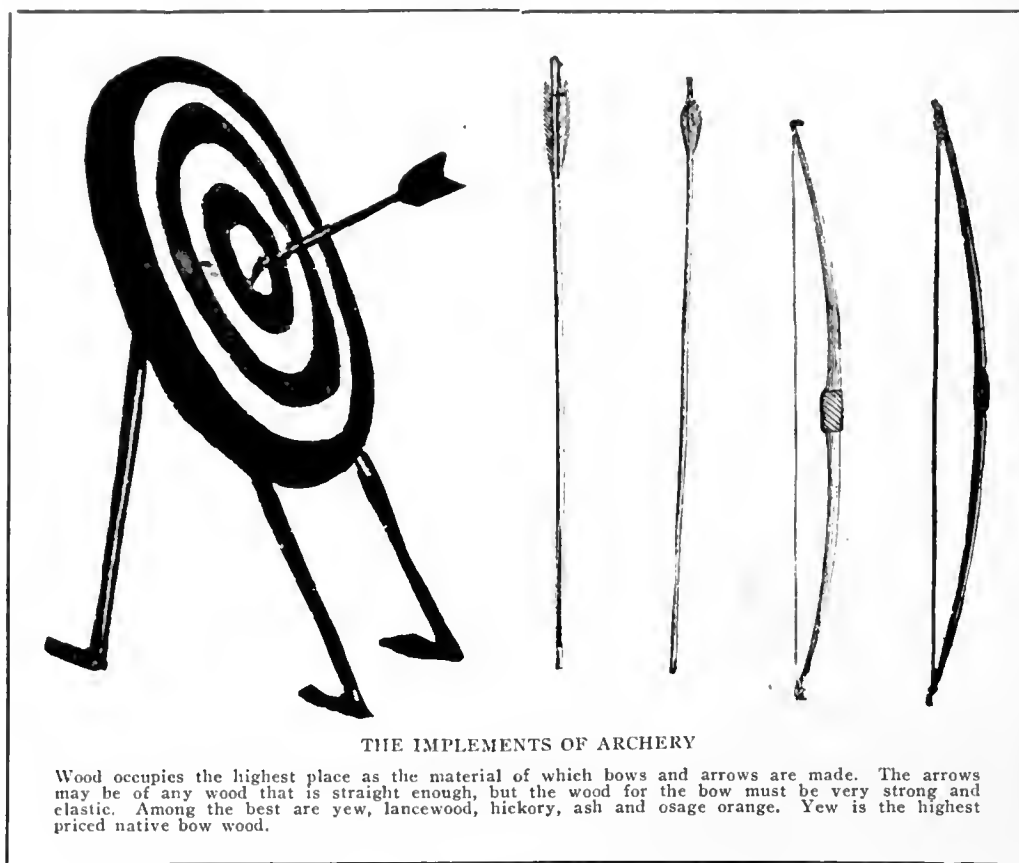
No gymnasium is considered complete that is not equipped with dumb bells, and wood is the favorite material of which they are made. The choice is given to the heavy, firm wood and preference to those most attractive in appearance. (Photograph by courtesy of J. B. Hellenberg & Company, Coldwater, Michigan.)



WOODEN ATHLETIC CLUBS

Most firm, heavy woods are suitable for the manufacture of Indian clubs, but perhaps more are made of maple than any other wood, though walnut and mahogany are often seen. (Photograph by courtesy of the J. B. Hellenberg & Company, Coldwater, Michigan.)

bow material is the yew that grows in Oregon and Washington. A bow made of this material by an expert may sell for one hundred and fifty dollars, though not more than one foot, board measure, of wood is represented in the finished bow. The selection of the raw material is one of the most particular jobs of the bow maker. He prefers a yew stave about half and half heartwood and sapwood,



so that the finished bow will display red heart on one side, and white sap on the other. No appreciable difference can be noticed in the resiliency in the heart and sap of yew, when it has been properly seasoned and prepared.

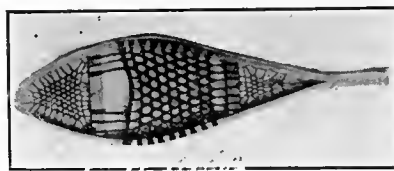
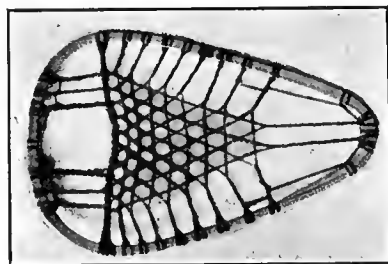
The bow and arrow were once the chief weapons of war and hunting. Now they are little used except for sport. Within the past two or three generations, hunters made use of the bow occasionally in the western country. A mounted Indian or white man with bow and arrows sometimes could kill more buffaloes than a man could kill with a rifle. At close range the arrow was as deadly as the bullet, it made less noise, and arrows could be discharged three or four times as rapidly as bullets from muzzle-loading guns.

The early English archers were rated the best of their time, and most of their bows were of yew. American Indians who were excellent archers, made bows of various woods, ash in Virginia, locust in Carolina, cottonwood in New Mexico, Osage orange in Texas and Kansas, and hornbeam and hickory in nearly all parts of the eastern half of the United States. Ten times as much wood was required for

large numbers in the northern country. Snow shoes and skis are familiar sights where winters are cold and snow is abundant. These are worn on the feet and differ in pattern and appearance, but both are employed in walking on the snow for both pleasure and business. They

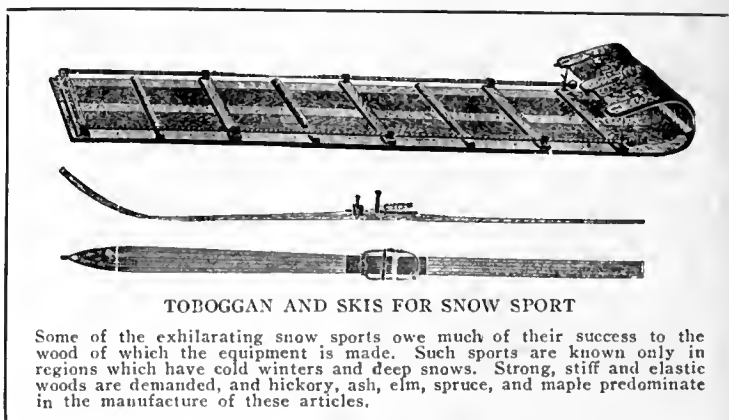
have a place in a number of games. The skis are thin, narrow boards, curved upward in front, usually from five to eight feet long. The snow shoe, as the term is usually understood, is shorter and broader, and instead of being all wood, it generally consists

of a wooden rim or hoop, cross-strung with thongs of



TWO STYLES OF THONGED SNOW SHOES

The long model in the illustration is the one in general use and is good on all kinds of snow. The other is the "bear paw" model and is more nearly round. It is suitable for rough country, steep mountains, and heavy snow. It is popular on the high western plateaus and in the far Northwest.



(Continued on Page 444.)

arrows as for bows, for a bow was good for years, but arrows were soon lost. An Indian hunter sometimes carried as many as sixty arrows. Some bows were as long as a man, others less than a yard in length. Sizes are fewer now, and the amateur archer learns to use what the manufacturer sells him. Many bows are still in use by Indian children. They become expert in killing squirrels or in transfixing woodpeckers. The skill of some of these children surpasses that of the average archery club member, though the latter may shoot with a bow that costs fifty dollars, and the Indian youngster's bow could be bought for fifty cents.

Appliances for games and sports connected with snow and ice are used in

TREES AND SHRUBS FOR THE HOME GROUNDS

BY LILIAN M. CROMELIN

AMERICAN FORESTRY is pleased to believe that there is a growing interest in the use of shrubs in beautifying the home grounds and wishes to encourage those who may hesitate to make ornamental plantings because of the supposed large amount of time necessary to set and care for the shrubs. As an example of what has been done in ornamental planting by a busy man before and after office hours and on holidays—and all in addition to caring for a large fruit and vegetable garden—the experience of Mr. C. P. Close, of College Park, Maryland, is given, together with photographs showing the beginning in the spring of 1909, the progress made, and the present appearance of his home. Besides the increase in property value due to the shrub-

The yard on Mr. Close's property is 150 feet across and 187 feet deep with the house facing east and set a little to the north and east of the center of the yard. It was built in 1908 and the landscape plan was worked out during the following winter. The place was bleak and lonesome in the spring of 1909 (Fig. 1) when the first planting was done. Additional planting was made in 1910 and a very little in following years. The growth in most cases was vigorous, almost too much so, for the shrubs seemed to think they were running wild and had to be tamed with the pruning shears two or three times a year. This growth means good soil, for practically no manure or fertilizer was used—only a little mulch of leaves or other vegetable matter.

The front walk has a double curve, which invites planting at both ends. The lawn was seeded in the fall of 1908 and reseeded in the spring of 1909. The house faces east, and part of the porch is uncovered.



Surface drainage is only fairly good in this section, so the cellar floor is only 18 inches below the ground surface, leaving most of the cellar wall above ground. This high wall permits the use of the tall shrubs shown in later pictures.

FIGURE 1. THE PLACE IN THE SPRING OF 1909, BEFORE ANY PERMANENT PLANTING WAS DONE. COULD ANYTHING LOOK MORE LONESOME? BUT WATCH THE TRANSFORMATION!

bery, the satisfaction of creating a beautiful spot in which to entertain one's friends and the birds and bees and rabbits, and the invigorating health resulting from out-door work in such surroundings, make it much worth one's while to spend a few dollars for shrubs for home planting.

Like everything else, the price of shrubs and trees has shot upward, but not in proportion to that of the wages of most classes of labor. Prices vary according to the kind of shrub, but range usually between fifty cents and one dollar each. The price of young trees like those shown in the photographs will probably vary from two to four or five dollars each. The investment is not great when it is realized that a dollar will grow into a ten to twenty-five dollar increased valuation in two or three years.

The pictures tell a part of the story of plant life on this attractive place, but space forbids the use of others which show the snowballs, lilacs, philadelphus, deutzia and spirea; colored-twigged dogwoods, jasmine and golden yellow Russian willow with evergreen background for winter effect; coral berry, abelia which flowers all summer; Japanese barberry eight feet high, magnolias, dwarf fruit trees and filberts in separate clumps, and a few nut trees and other things.

The house sets on a high cellar wall so large shrubs were needed next to the house and shorter ones next to the lawn. At the front to the left of the front steps is a group of *forsythia suspensa* or golden bell. These think nothing of shooting up eight or nine feet on short notice and need about three prunings a year, one after



GROWTH IN FIVE YEARS.

Figure 2. May, 1915. The tall shrubs at the right of the picture are Tartarian bush honeysuckle, both white and red flowered. These are pruned severely in early spring and grow four to 6 feet in a season. In front of the right half of the covered porch are forsythia *suspensa*, or golden bell. These are among the earliest spring bloomers. In front of these and next to the lawn are *deutzia gracilas*, which have the most graceful spikes of delicate and fragrant white waxy blooms. The low evergreens along the walk are dwarf Chinese golden arborvitae. The tall ones are pyramidal golden arborvitae. These grow rather rapidly and must be clipped back occasionally.

TWO-YEAR GROWTH.

Figure 3. May, 1911. This shows the right of the front steps and is a striking contrast to Figure 1, just two years earlier. The tall plants next to the porch are rose-colored weigelia. These are rank growers, forming long plumes of beautiful flowers. The plants in bloom are spirea Van Houtteii, the most graceful of all the spireas and usually called bridal wreath. The plants next to the lawn in the foreground are the feathery foliaged spirea Thunbergii. This is the earliest spirea to bloom in the spring. In the angle of the porch to the left are two plants of European euonymous. All of these plants except the euonymous should be pruned in spring as soon as they have bloomed.

ALSO TWO-YEAR GROWTH.

Figure 4. August, 1911. This is a continuation of Figure 3 around to the right. The clumps in the center background are hydrangeas on each side of the cement walk at the front entrance. These two-year-old plants of *hydrangea paniculata grandiflora* are nearly four feet high and in full bloom. To the right of these is a bed of perennial phlox. These were taken out later and replaced by shrubs, such as *abelia*, *hydrangea hortensis* and dwarf *philadelphus*. To the right of these the tall, healthy looking plants are European euonymous, shown in Figure 3. In front of these, next to the lawn, are Japanese barberry. The vine on the front of the porch is *clematis paniculata*. The top of this vine kills down each winter, so it does not show in Figure 3, taken the previous May.

AFTER THREE AND A HALF YEARS.

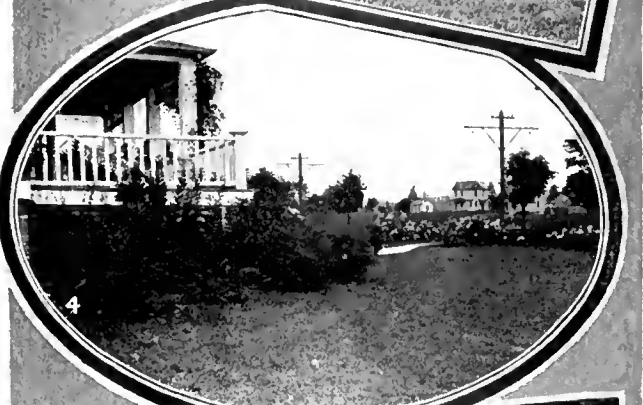
Figure 5. August, 1912. Compare with Figure 1, taken 3 1/2 years before. Is this transformation possible in so short a time? The picture says, Yes! The shrubs next to the house are described in detail in Figures 2, 3 and 4. The California privet hedge as shown is about 5 or 6 feet high. The big white blooms just inside the hedge are the hydrangeas shown from the other side in Figure 4. At the corners of the covered porch are robust plants of *clematis paniculata* in full bloom. The two "alligators" climbing over the porch railing at the right are bitter-sweet and dutchman's pipe vines getting up in the world.

FIVE YEARS FROM BARE GROUND.

Figure 6. This shows the place in May, 1914. The two Norway maple trees in the foreground were moved there in April, 1909. Most of the top was cut off and they were taken up with big balls of earth around their roots. In the back yard are four more of these trees, moved there at the same time. At the left of the front steps is a clump of spirea Van Houtteii in bloom (see Figure 7), and at the left boundary of the yard, partly hidden by the trolley pole, is another clump of the same kind in bloom. In a corner of the yard to the left of the trolley pole and just inside the hedge is the clump of lilacs and snowballs, the latter being in bloom, and at the right of the picture is a group of native trees and shrubs moved in from the fields and woods.

ALL IN FIVE YEARS.

Figure 7. May, 1914. Group of spirea Van Houtteii, shows also in Figures 3 and 6. This forms big, graceful billows of bloom resembling a frozen waterfall. The gem of the spireas, five years after planting. The evergreen checking its overflow is *retinospera ericoides*, with its dense, dark green, feathery foliage, which is hardy and stands any exposure perfectly.



blooming in the early spring and two later at intervals of a few weeks to keep them from hiding the house. During the winter the English sparrows enjoy picking off the blossom buds. In front of these are *deutzia gracilis*, with the most graceful, delicate and fragrant of white waxy blooms. To the left of the *forsythias* round the corner of the porch is a background of *collutea arborescens* in front of which are red and white tartarian honeysuckle. The *colluteas* grow as fast as the honeysuckles and bloom nearly all summer, the blossoms being followed by large swollen seed pods. The single bush in the lawn, a few feet from the honeysuckle, is *Berberis neubertii*, the holly leaved barberry. This helps to form the background to screen the back walk from view. Figures 2, 3 and 4 show this section at different times.

taken out and replaced by *Eva Rathka wiegelia*, a late bloomer with deep red flowers. All of these plants should be pruned in spring as soon as they have bloomed.

The hydrangeas, shown in Figure 4, grew to be eight feet high, covered with hundreds of immense white blooms turning pink when cool nights came in September and October. The blooms come on new growth of the same year, so early each spring the last year's growth must be cut back to short spurs of two or four buds. To the right of these is a bed of perennial phlox. These were taken out later and replaced by such shrubs as *abelia*, *hydrangea hortensis* and dwarf *philadelphus*. There is a hedge of California privet just outside these beds.

In front and just to the south, extending into the



THE GARAGE AND PERGOLA

Figure 8. The effective setting of the garage, shown in the Summer of 1910. The pergola was built in the Spring of 1909 and the wisteria planted then. The end plants are Japanese wisteria and the center ones are native American wisteria. (See also Figures 9 and 10.) The vines on each side of the garage door (facing east) are matrimony vines. They are supported by wires running from the base board to beneath the eaves and then across above the door. The little evergreens in front of the pergola were planted on Arbor Day, 1909, to form a wind brake against the cold northwest winter winds. (See Figure 12, five years later.) The one nearest the camera is a Colorado blue spruce which developed into an unusually beautiful specimen, admired as much as any other single tree or shrub on the place. The automobile drive is between the pergola and the evergreens. At the left of the cement walk leading to the back porch, but not shown here, is the corner planted to native trees and shrubs, the other side of which is shown in Figure 14.

At the right of the front porch is a group of *weigelia*. In front of the *weigelia* are *Van Houttei spirea*, the most graceful of all the spireas, and around to the right are *Thunberg spirea* plants. This is the earliest *spirea* to bloom in the spring. In fact, it has such a nervous disposition that a few days of winter sunshine will cause it to send out scattering blooms any time between November and April. This habit makes it unsatisfactory because it seldom has a full bloom in spring. The *Van Houttei* in full bloom is shown in Figure 7. To the right, around the corner of the porch, are *Eva Rathka wiegelia* and two plants of very slender and beautiful *philadelphus*, or mock orange, which replaced two plants of European *euonymous*. These were not satisfactory because they bloomed so sparingly, thus making no show of their strikingly handsome seed pods, so they were

lawn, are the spiny but graceful Japanese barberry bushes. In a few years these little fellows developed into stately graceful specimens eight feet high, an unusual size. In the spring every shoot has a row of tassel-like yellow flowers hanging from the under side, and every flower has its honey bee. Each flower is followed by a slender berry which turns bright red in the fall and gives color and cheer to the plants all winter. The many rows of small yellow-green blooms on these make the honey bees happy for a couple of weeks in spring and the bright red berries during the late fall and winter add a dash of lively color to brighten up the sleeping bushes.

The vine on the front of the porch is clematis. The top all kills down each winter, so it does not show in Figure 3, taken the previous May. The two "alligators" climbing over the porch railing at the right, shown in

Figure 5, are not "alligators"—they are bitter-sweet and Dutchman's pipe vines getting up in the world. Duplicates of these are at the opposite end of the porch. These were all taken out later because they helped to hold the moisture which caused the porch timbers to decay. The bitter-sweet became quite a nuisance in overgrowing and twining around shrubs and had to be cut back several times a year.

The matrimony vine, which climbs up at each side of the garage door, shown in Figure 8, is very effective and satisfactory. Part of the main stems die each winter, but enough are always left to make an enormous growth. Each spring all branches are cut back to stubs and during the summer many shoots must be trimmed off at the sides and above the door. These plants produce myriads of little flowers, dearly loved by the bees, followed by red berries which hang on nearly all winter.

On the ground within the pergola, shown in Figure 9, is the winter feeding place of such birds as the Kentucky cardinal, junco or snow bird, an occasional blue jay and the ubiquitous English sparrow. They enjoy finely cracked sweet corn, pop corn and field corn. Extending out across the lawn to the south from the barberries are the bright twigged shrubs which have their innings in winter when the beautiful bark colors are at their best. Here are the dark green jasmine, the pale green dogwood, the rich red dogwood and the bright yellow Russian willow—and one white birch. These have an evergreen background of cypress and Norway spruce and the color

effect in winter is striking. Just south of the Russian willows a group of *cleagnus longipes* marks the south boundary. The flowers of these plants are rather inconspicuous, but they develop into beautiful cherry-like red fruits with many gray dots. These ripen just after Early Richmond cherries and the robins and cat birds are crazy to get them. To the east of these shrubs along the south boundary are first a group of Van Houttei spirea and purple leaved barberry, then single plants of crape myrtle and *magnolia stellata* backing up a bed of German iris. These reach to the corner group of snowballs and lilacs. The lilacs are wonderfully fine, with large clusters of fragrant double flowers of white, dark purple and shades of lavender color, except the Persian lilac which has the most delicate single flowers. The snowball bushes are simply masses of white balls when in bloom.

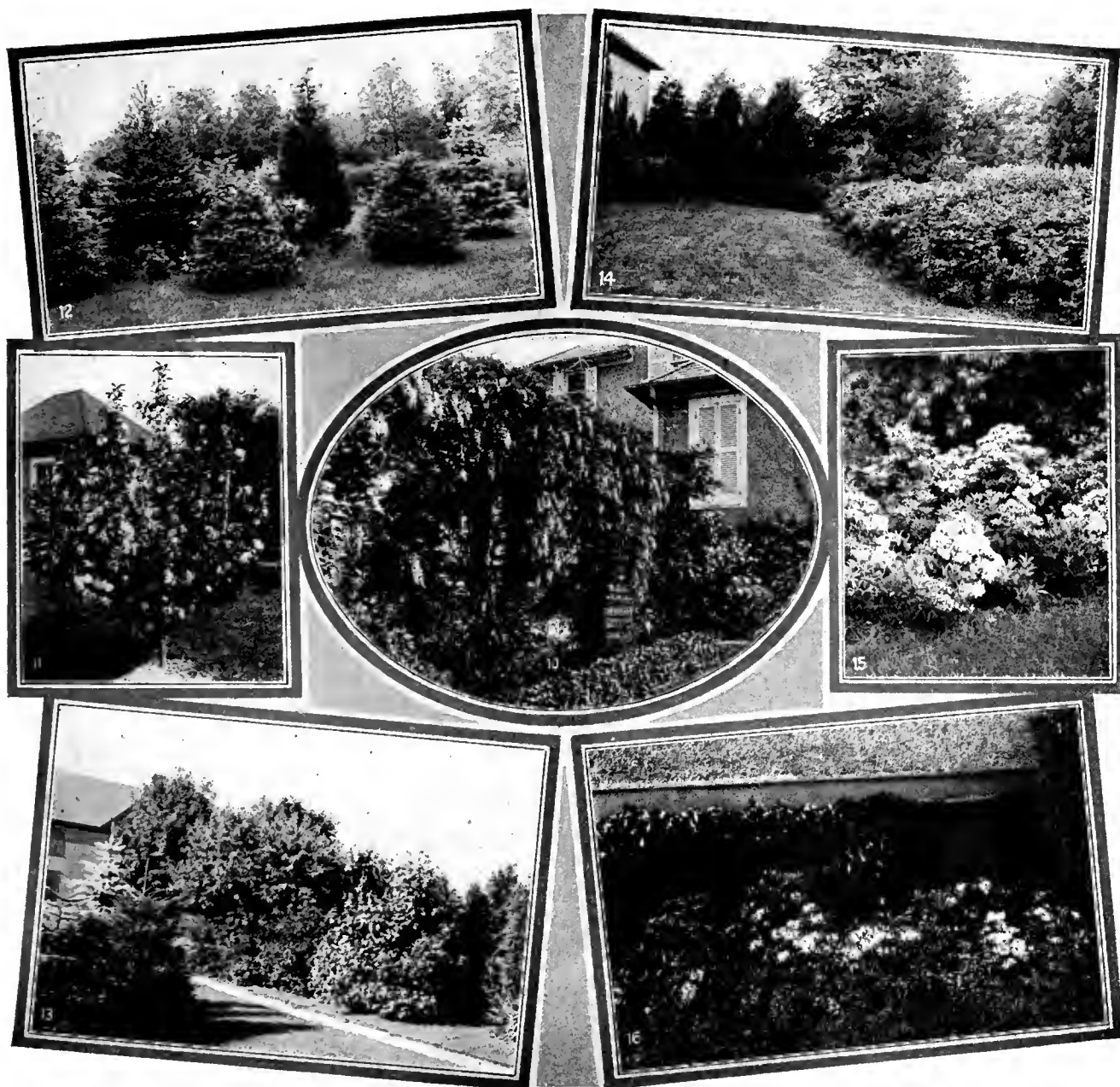
The evergreen windbrake, shown in Figure 12, was planted in 1909 and has flourished beyond belief. Three years after this picture was taken the limbs were touching in places and the tallest trees were about twenty feet high. Farther to the left, but not shown in Figure 12 are a second Nordman fir and a Norway spruce which are shown at the extreme left in Figure 9. Between the evergreens are rhododendrons in bloom. During one very cold winter the Lawson cypress was slightly but not seriously nor permanently injured. The others are as hardy as oaks in this northwest exposure. They will need pruning to prevent injury by crowding.

The bag worm is very fond of the taste of the Colorado



THE PERGOLA IN FIVE YEARS.

Figure 9. This is south side of the pergola on May 31, 1914, five years from planting. The end plants are Japanese wisteria and those blooming in the right center are the American wisteria. The Japanese plants bloom earlier and have flower clusters 22 inches long, of the most delicate lilac color. They are wonderfully beautiful. No doubt all of the plants would produce larger blooms if they were pruned moderately each spring after the manner of pruning grape vines. The flower clusters are borne on the new shoots like grapes. The Japs are much stronger than the others, and all are perfectly hardy. The low plants at the base of the pergola are rank growing single violets, which bloom very early in the spring and always have a few flowers tucked away under those great leaves when heavy freezing weather comes in the fall. Along both sides of the pergola are scores of giant narcissus bulbs and a few tulips—asleep now, but producing hundreds of big, nodding flowers in the spring. The bulbs on the south side bloom a week or ten days earlier than those on the north side, and they are of the same varieties. The clothes line post in the foreground is surrounded by a big mass of pampas grass.



THE BEAUTIFUL WISTERIA.

Figure 10. May, 1914. American wisteria shown in all the glory of its beautiful lilac-purple blooms. It is a mass of beauty. A light second crop of blooms comes in late summer and a scattering cluster in the late fall. This seeds very freely. It is one of the best of all climbers for a pergola or arbor cover and is perfectly hardy here. The flowers next to the house are the climbing rose, *Tausenschoon*.

DOUBLE FLOWERING CRAB.

Figure 11. May, 1915. This is the most beautiful of all the double flowering crabs, known as the Bechtel Double Flowering. The flowers come in clusters, and each one resembles a small shell pink rose. The fragrance is exquisite. The tree never fails to give a big crop of blooms and is a veritable bouquet. This one was planted in 1909. It is hardy and will stand any exposure in this latitude.

THE WINDBRAKE.

Figure 12. June, 1915. The evergreen windbrake planted in 1909. The tree at the right is a Colorado blue spruce of a gorgeous silvery hue in spring when it puts on its new costume. Next to it is a Norway spruce; then come the Lawson cypress, Nordman fir, white spruce and another Norway spruce. The white spruce is the most vigorous grower of the lot. Lawson cypress is also tall and vigorous, and the others are all lusty growers. Three years after this picture was taken the limbs were touching in places and the tallest trees were about 20 feet high. The trees beyond the evergreens belong to a neighbor.

THE BACK WALK

Figure 13. June, 1915. Looking from the back porch north along the back walk also shown in Figure 8. At the left of the walk are three of the evergreens shown at the right in Figure 12, the nearest one at the left being Nordman fir, the next Norway spruce and one with the light-colored top Colorado blue spruce. At the right are the native trees and shrubs shown from the opposite side in Figure 14. Beginning at the right are two red cedars, then a couple of sweet gums with star-shaped leaves, then a native crab and a large spreading choke cherry. These plants were carried in from the fields and woods in 1909 and later years. The automobile drive is between the walk and the evergreens as shown in Figure 8.

JUST AN ODD CORNER.

Figure 14. June, 1918. The wild corner. The background is the opposite or east side of cedars, sweet gums, etc., shown in Figure 13. From left to right there are cedars, sweet gums, more cedars, native crab apple, Spanish oak, choke cherry (the large tree in the right center), native scrub pines, these being really in front of the choke cherry. The other trees in the background at the right are across the street. In front of the pines and choke cherry are several small holly trees which produce an abundance of berries for holiday decorations. There is also a strawberry bush (*euonymus americana*), with gorgeous seed pods between the gums and cedars. The low plants to the left of the center in front of the cedars are mountain laurel, shown in bloom in Figure 15. At the right the large bed is the Japanese rose (*rosa rugosa*). The north end of the pebble dash house is nearly covered with English ivy. This ivy does not succeed in any other exposure. In the spring it forms many clusters of pale greenish waxy flowers. The single shrub near the house is the holly-leaved barberry (*Berberis neubertii*).

NOTHING ELSE NEEDED

Figure 15. June, 1915. Mountain laurel (*Kalmia latifolia*), in all the beauty and glory of its native heath, with a background of red cedar, choke cherry and scrub pine—part of the wild group shown in Figure 14. These get the morning sun, but not much afternoon sun. They are as contented and happy here as though they were still in the wild woods.

THE NORTH END.

Figure 16. May, 1915. Native azalea or bush honeysuckle (*Azalea nudiflora*), next to the north end of the house. These bloom as freely and beautifully as their wild sisters. They do not miss the freedom of the woods nor pine to return. Only the early morning sun strikes them. The background is English ivy on the foundation wall.

[All pictures were taken by Mr. C. P. Close.]

blue spruce and Lawson cypress. (Fig. 12.) The former was somewhat injured at the tip before the worms were discovered but hand picking and arsenate of lead spray cleaned out the invaders.

The large bed at the right in Figure 14 is the Japanese rose, *rosa rugosa*. This has rich, glossy, crinkled foliage, beautiful all season and large white and red single roses. In the fall there are many clusters of yellow-red seed pods. Each spring these plants are cut back to about eighteen inches, thus a heavy mass of foliage of uniform height is secured each year. Figure 14 shows the north end of the pebble dash house nearly covered with English ivy. This ivy does not succeed in any other exposure. In the spring it forms many clusters of pale greenish waxy flowers. The single shrub near the house is the holly leaved barberry, *Berberis neubertii*. This does not blossom but has large, dark green, spiny leaves which become bronzed in early winter and make good holiday decorating material. The leaves drop in midwinter. Next to the

house but not shown in this picture is a bed of native azalea (see Fig. 16).

The native mountain laurel and the rest of the wild group, shown in the center background of Figure 14, get the morning sun, but not much afternoon sun. They are as contented and happy here as though they were still in the wild woods, see also in Figure 15. In 1909 and 1910 these plants were dug with good balls of earth and transplanted here in full bloom—and never withered or regretted it. By digging in full bloom the plants with pinkest flowers may be chosen. When transplanted they should be mulched with vegetable matter and be watered often for a few weeks.

The native azaleas, or honeysuckle, shown in Figure 16, were also dug in full bloom and transplanted here in 1909 and 1910 with the same care given the mountain laurel in Figure 15. The plants with richest blooms were selected and they find a charming background for their profusion of lovely bloom in the English ivy on the foundation wall.

THE USE OF WOOD IN GAMES AND SPORTS

(Continued From Page 438.)

leather. Snow shoes of this kind are not always classed as sporting outfits. They are strictly for business during the deep snows and the severe winters of the far northern regions. Trappers, hunters, and travelers once habitually wore such in winter and moccasins in summer. Custom has changed somewhat now, in regions which have become thickly settled; and the snow shoe and the ski have taken their place among implements of sport.

The snow shoe, with its broad, latticed, rawhide bottom, is serviceable in walking over soft snow. The wearer does not expect to develop much speed. The sport consists in walking on snow so soft that, without such appendages, he would sink into it. Northern hunters in former times made their own snow shoes with hatchet and knife, and if leather thongs were not at hand, the lattice soles could be woven of basswood bark which can be stripped in winter as well as in summer. Bark of several other trees will serve also. Expert

woodsmen knew the art of heating the bark to make it peel in winter and to divide into strands of convenient size for braiding into soles for the snow shoes.

The hunter could split his ski material with hatchet and wedges; but the man who used snow shoes for business, nearly always preferred the broad, short pattern, with braided whang bottoms. They were more reliable than the long skis.

As articles of sport, the ski and the snow shoe are popular. The sportsman does not make them himself as the pioneer hunter did. He buys the factory-made product. The latticed snow shoe resembles in a general way a large tennis racket with the handle missing. The body of the shoe is two or three feet long and twelve inches or more wide at the broadest part. The rim is of ash, hickory, or elm. The ski is made of beech, birch, maple, ash, or spruce. The latter wood is lighter but not so strong as the others.

TWO LANDMARKS AT CORNELL PASS

TWO of the three giant white pines at the head of President's Avenue have at last bowed their heads. Familiar to many generations of Cornellians, these two landmarks, which towered over their neighbors, the beautiful elms planted by the Class of '72, have outlived their usefulness and are now stovewood. One of the laborers employed by the University—a genial, red-faced old Irishman—stopped the saw which was cutting into the heart of one of these old monarchs, and straightened up to say:

"Yis, sor, thirty-three years ago, when I furst cum to Ithaca and Mr. White was president and lived in that very house you see there," pointing over his shoulder to the president's house overlooking campus and valley from its eminence at the head of the avenue, "when I furst cum here, these trees was as big as they are right now, and there's others will tell you the same. Nobody

knows how long they've been a-standin' here.

"And a shame it is to cut 'em down, sor, but you know they was shadin' the elms and the poor devils was dead anyway. Shure, and maybe they're afhter needin' a rest, too, watchin' over Cornell these long years the same as President White himself. Ah, there was a grand ould man, and don't you fergit it, sor!"

So these two monarchs of the forests that covered the hills above Cayuga long before Mr. Cornell was born, have passed to their rest. They have seen a great University spring up and grow at their very feet; many problems have been solved and many hearts made lighter under the shade of their branches. Possibly these tall and stately trees, standing straight and true against the sky at the top of the hill, helped to influence the founder to choose this spot for the beginning of Cornell.—(*Cornell Alumni News.*)

SNAKE LORE FOR FOREST LOVERS

BY R. W. SHUFELDT

(PHOTOGRAPHS BY THE AUTHOR)

FROM a purely biological standpoint, snakes constitute a wonderfully interesting group of animals, as such, to study, while from an economic angle they deserve careful research and investigation. There are many points in the natural history of them that are of interest to lovers of forests. There are in the United States

inasmuch as they feed upon a great variety of noxious insects that injure or destroy our crops. Of venomous ones we have the Copperhead, the Water Moccasin, some dozen different kinds of Rattlesnakes, the mildly venomous Opisthoglyph snakes, and a couple of Coral or Harlequin snakes—less than twenty, leaving over eighty that are entirely harmless, apart from the few that occasionally kill and devour poultry or steal their eggs, which rarely happens.

Many chapters, in many parts of the world, have been published on the nature of snake-bite and its treatment; but it is not the object of the present article to go into that, further than to say that we now have an antitoxin which has been proved of great value in saving life, where a person has been bitten by a venomous reptile. Our own surgeons are using it, and it has been in use in India and in other countries for comparatively a long time. Apart from this, it is an extremely important point to know, when one has been bitten by a snake, whether that particular snake was a venomous species or otherwise. Such information is of the utmost service



MODEL OF THE HEAD OF A VENOMOUS SNAKE

Fig. 1. This model is considerably larger than here shown, it being a beautiful reproduction of the essential parts of the head of a venomous snake. It is in the Museum of the Surgeon General's Office of the Army, at Washington, D. C.; it may be taken all apart, and thus used for lecture purposes. The diagrams A and B in the lower left hand corner show the patterns of the tooth-punctures found after the bite of a venomous snake (A) and of a harmless one (B).

considerably over a hundred different kinds of snakes that have been described by naturalists. Their distribution differs widely, some having very wide ranges, while others occur only in limited areas. Some are rare, others are extremely abundant; some are very plain in coloration, others are more or less brilliantly colored. In size they vary greatly, running from a few inches in length to six or seven feet. Our uneducated classes believe all snakes to be venomous, whereas only a comparatively few of them are so; and many are of value to man,



CHAIN OR COMMON KING SNAKE

Fig. 2. This beautiful species is entirely harmless and very gentle. It ranges from southern New Jersey to Florida. Large specimens are about a yard in length.



INTERVIEWING A SIX-FOOT BLACK SNAKE

Fig. 3. Snakes are, as a rule, not difficult subjects for photography; but much depends upon the experience and tact of the photographer and upon the temper of the snake. Here, as in all animal photography, gentleness and patience usually wins.

to physicians and surgeons, and hardly less so to the person who has received the bite.

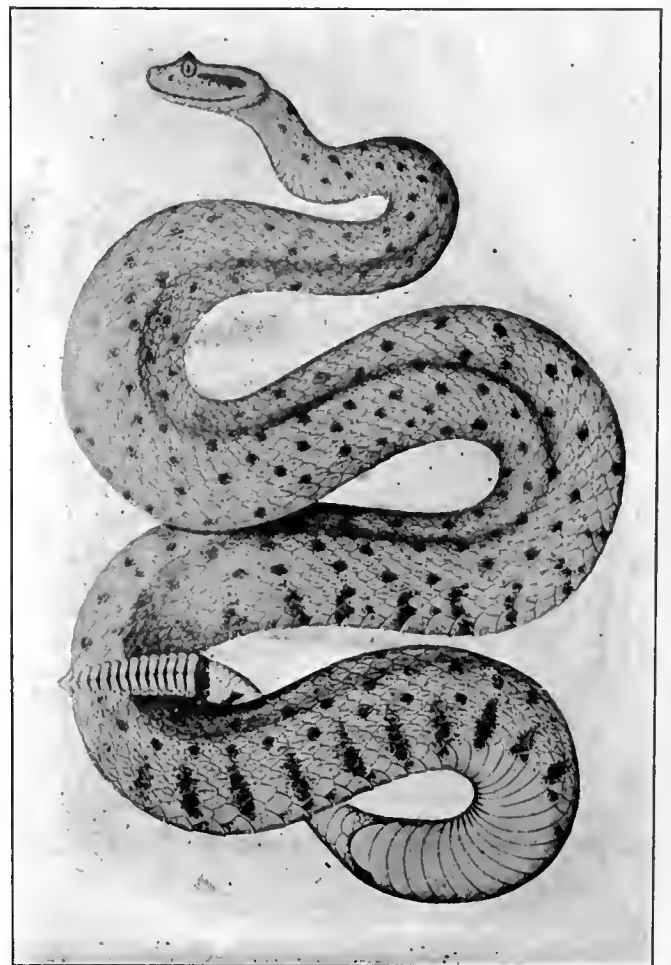
Several times in the writer's own experience, where he has been called to attend a case of snake-bite, the patient had undertaken to apply the usual popular remedies—that is to say, the place bitten had been freely sucked; two or three ounces of whiskey had been administered; a ligature tightly applied above the wound, and the latter perhaps lanced or even cauterized. Upon the arrival of the surgeon the patient usually assures him that he has done all in his power with respect to initial treatment. When questioned as to what was done with the snake, the usual prompt reply is that its head had been smashed, the body cut up, and the whole thrown where it could not be recovered. Unfortunately, this eliminates a most valuable aid in diagnosis. Next, when did it happen? And the reply is, "About two hours ago." "And you have no pain or other symptoms?" "No; only some in the wound."

Upon examining the punctures made by the teeth of the snake, they appear exactly like those in *B* of Figure 1, and not like those in *A* of the same cut. It will be noticed that in the upper part of *A*, on either side, there are three punctures, of the sizes and arrangement shown. These

represent the punctures made by the fangs of a venomous reptile, and when the wound exhibits these, prompt remedial measures are called for. On the other hand, however, if the punctures of the teeth are arranged as shown in *B*, the bite was from a non-venomous snake, and all that is called for is to suck the wound for a time and no harm will follow. In these two diagrams, the *outer rows* are made by the teeth of the upper jaw and the inner ones by the lower—a fact that will be appreciated by studying the head of the venomous snake reproduced in the same figure (Fig. 1).

These facts are well worth remembering; and if intelligently applied they may save the person bitten no end of pain, trouble, and expense. Up to date the writer has never been bitten by a venomous reptile except by the "suspected" Gila Monster or *Heloderma*; but on the other hand he has been bitten upon numerous occasions by blacksnakes, garter snakes, puff adders, and various other species, both great and small.

Most of our American snakes are terrestrial by nature; some are secretive or burrowing, and one or two are

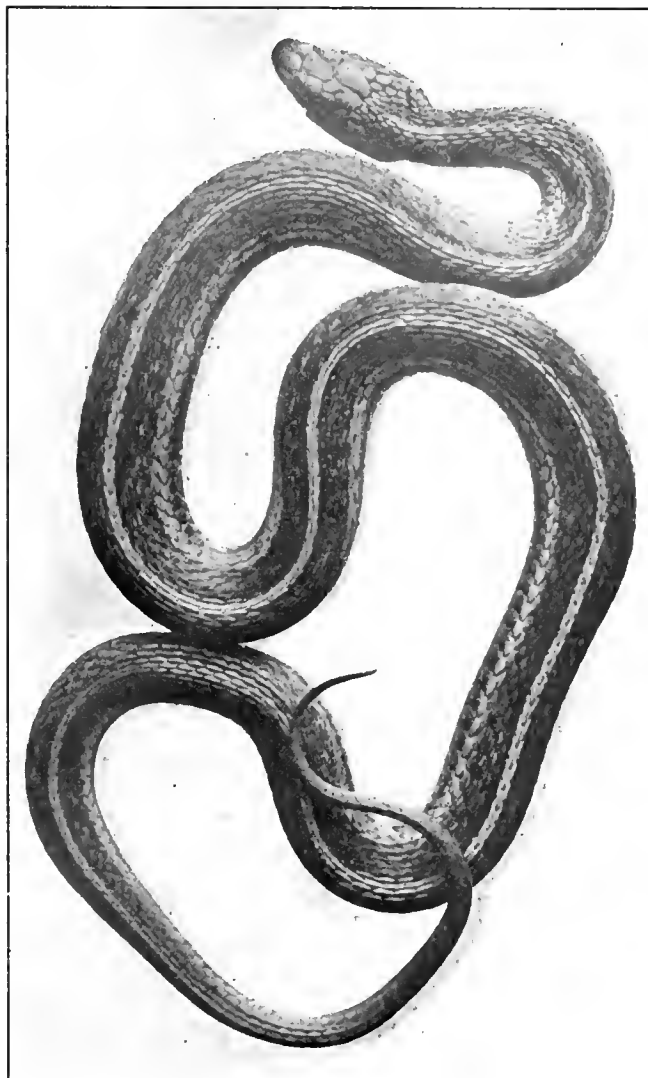


HORNED RATTLER ALSO CALLED A "SIDE WINDER"

Fig. 4. No rattlesnake in our fauna is more distinct than this one, it being one of the smallest of all the venomous reptiles, and may at once be recognized by the little horn over either eye. It occurs on the desert areas of southern California, Arizona, Nevada and Utah.

either semi-aquatic (Water moccasin) or arboreal (Cyclophis). As a rule, they lay subellipsoidal, white eggs; while a few, as in the case of the common water snake, bring forth their numerous young alive.

Omitting any notice of the three beautiful Boas found in Lower California and Arizona, and the small Texan and Californian blind snakes (*Glauconia*), we may pass to the Garter or striped snakes. Of these there are many species found in different regions of the United States. Some are by habit gentle, very beautiful, and attractive in many particulars (Figs. 5 and 6). No one of them is in the slightest degree venomous, although several of the species are vicious by nature, and will bite one if incautiously handled. They are extremely variable with respect to coloration and markings, and Dr. Raymond L. Ditmars says of them in his "Snake-Book" that "no genus of North American serpents is so difficult to describe as the present one—and particularly to treat in a popular manner. Among several of the species, the variations in pattern are so elaborate, that to describe the species on the basis of coloration alone would be to bring about a meaningless repetition of exhaustive details. The common species vary in a bewildering degree, and in such



A COMMON GARTER SNAKE

Fig. 5. This specimen was taken by the writer in the District of Columbia, and was photographed before it was sent to the "Zoo" at Washington. It is a snake with a bad temper; while its bite, although by no means agreeable, is attended with no danger whatever.



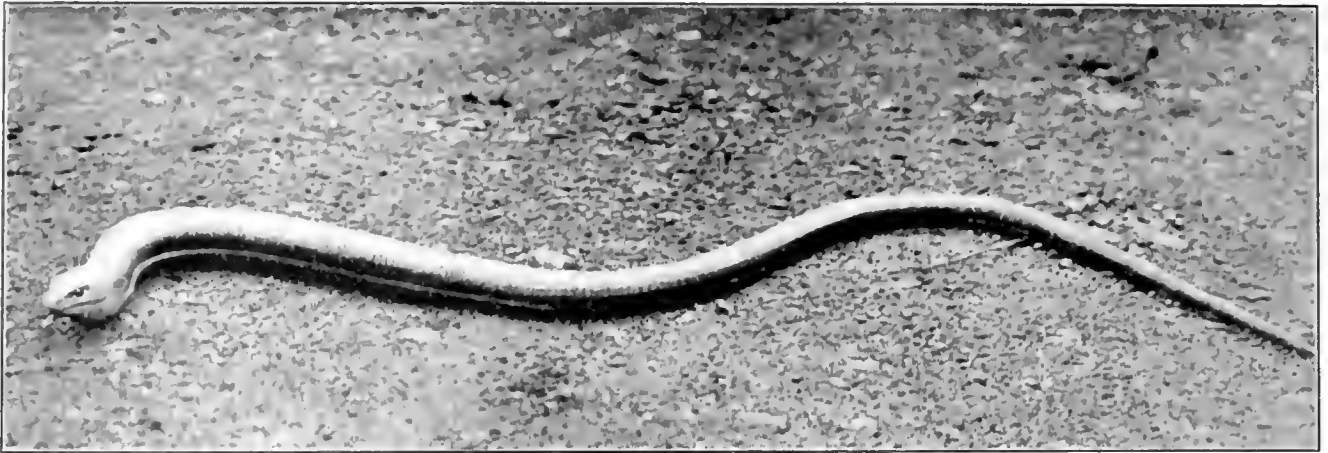
THE LITTLE RIBBON SNAKE

Fig. 6. Ribbon snakes of the species here shown are found throughout eastern United States; they inhabit the reedy margins of ponds and streams, subsisting largely upon small frogs and other aquatic forms. This one was captured and photographed by the writer, and it was found in the very plant here shown.

a fashion that the beginner might be led to mistake a pronounced variety of one species for the typical form of another."

Many of the species of the Garter snakes are more or less aquatic by nature, and live upon amphibious animals of various kinds, as frogs, toads, insects, or even small fishes, when they can take them. A Garter snake once captured by the writer on the banks of the Hudson River, near New York City, gave birth during one night to no fewer than seventeen very beautiful young ones. A fine 8x10 negative was made of this family, and is now on file with many other snake negatives in the writer's collection.

Garter snakes, when kept alive under proper conditions and regularly fed with fish, frogs, etc., are found to present many habits of marked interest to the students of the genus of reptiles. In the Reptile House of the Bronx "Zoo", at New York, one may see numbers of



OUR LIMBLESS LIZARD—THE "GLASS-SNAKE"

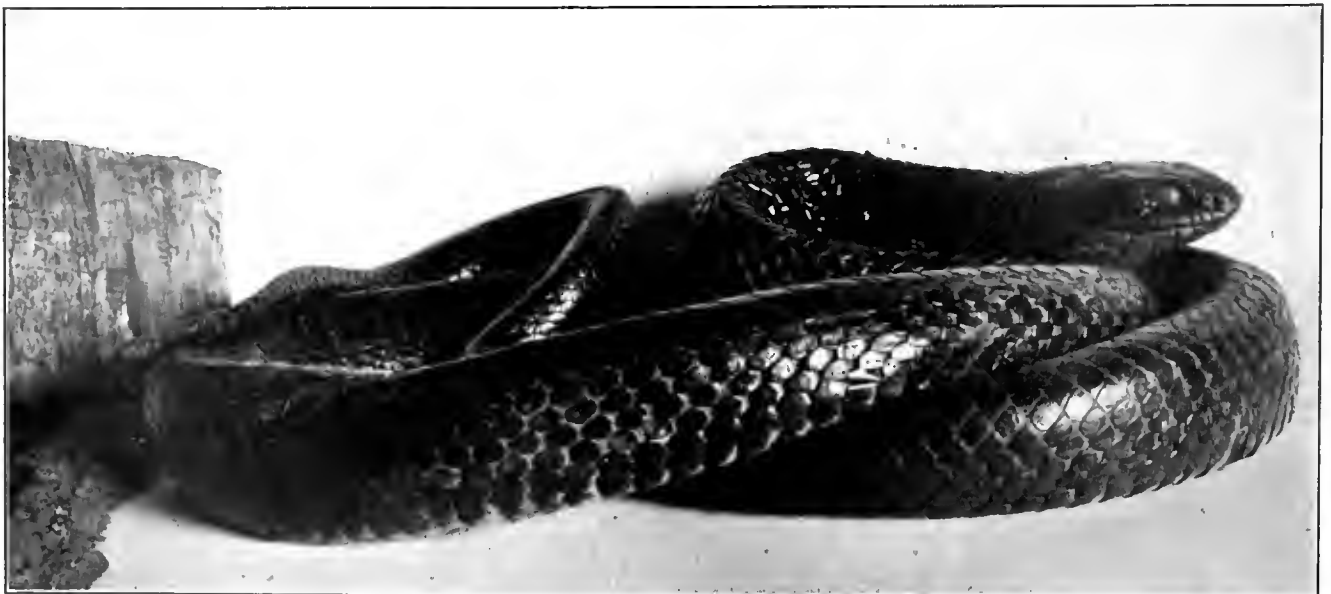
Fig. 7. A lizard with no legs might easily be mistaken for a snake by one unfamiliar with our common reptiles. This picture of one of the species which lives in Central and Eastern United States was made from a cut in "Animal Life" by the writer. (Published by Hutchinson and Company, of London.)

various species of garter snakes in confinement, and it is wonderful to watch them at feeding time. After seizing their prey, they have a way of violently thrashing their tails, and otherwise behaving in a most frenzied manner.

Some of our garter snakes are spotted, as Marcy's Garter Snake, of central Texas and Arizona. All garter snakes are perfectly harmless, and if properly handled will not even bite. Our common garter snake hibernates during the winter, many often being associated in the same lot. Without exception, they all bring forth their young alive, and many of them are kept as pets from one end of the country to the other. They bear captivity well; some even come to know their keepers, and take small frogs and fish from their fingers—sometimes coming to the door of the cage to get what is offered to them.

We have over a dozen species and subspecies of King snakes in this country (*Lampropeltis*); they are all harmless, extremely gentle, and wonderfully beautiful as a rule. The type species is the Common King Snake, also called Chain or Thunder snake (*L. getulus*). A beautiful, living specimen of the Florida King Snake (*L. g. floridana*) was recently sent the writer by Mr. Fred W. Walker, of Orlando, Florida (Figs. 2 and 3), and this is now living in the "Zoo" at Washington.

In all the forms the scales of the skin are lustrous, glassy, smooth, and show prismatic colors on movement. Some forms are jet black with vivid white markings; others are greenish, or brown, or olive and yellow markings. These serpents must be seen to be admired, and different forms of them occur in all parts of the country.



THE GOPHER OR INDIGO SNAKE

Fig. 8. A specimen taken in New Orleans by the writer had a length of six feet, three inches. It was of a shiny, rich blue-black or purplish black above, and somewhat lighter on the lower parts; it is a harmless species in all respects.



YOUNG OF THE PUFF ADDER

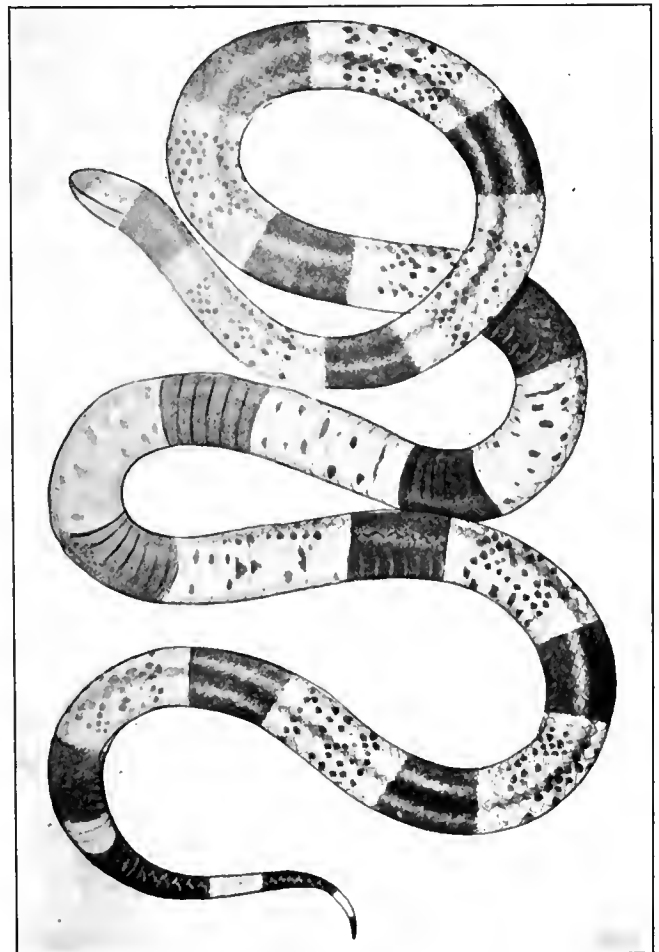
Fig. 9. Here we have two pictures of the same specimen; it is the beautifully marked young of our harmless Puff Adder or Hog-nosed snake, the colors being a rich brown on a pale tan. In the lower section of the picture the snake is blowing itself up preparatory to puffing.

They are most useful to the agriculturist as they catch and devour thousands of field mice, while most of the species—the common King Snake in particular—prey upon the venomous snakes; hence their name of King Snakes. Hundreds upon hundreds of rattlers are trailed, captured, and devoured by King snakes every year. To see a King snake attack a big rattlesnake, get away with him by squeezing him to death in its coils, and then swal-

lowing him, is a scene not likely to be forgotten. One of the most remarkable facts is that all King snakes are immune with respect to the venom of venomous species. One may inject with a hypodermic syringe a big dose of rattlesnake poison into any part of the body of a King snake, and it will have no more effect than so much water. Copperheads are destroyed and eaten in the same way; so it may be said that this species and its various subspecies should be protected and preserved on all occasions, if for no other reason than what it accomplishes in destroying the dangerous serpents of the country.

Like the Indigo snake, the King snakes live in captivity for years, and are always gentle and inoffensive towards their keepers. They lay from ten to a couple of dozen of eggs, which, under proper conditions, hatch out in about a month and a half. The writer has had King snakes of several forms in confinement on numerous occasions, and has frequently noted their wonderful muscularity; it is no wonder they possess the power to strangle to death the biggest rattler that ever lived.

Some of our handsomest serpents are the big, harmless, and elegantly colored Rainbow snakes, as the Red-bellied



CORAL SNAKE

Fig. 10. Coral snakes, also known as "Harlequin Snakes," are brilliantly colored species, the bands being black, orange, and rich vermilion. It is a somewhat venomous species, and a few deaths are recorded from its bite. They are more or less abundant in Florida; the one here shown is the western form.

and the Rainbow of the southeastern sections of the country. These are species that reach nearly fifty inches in length, and are burrowing forms with respect to their habits. The writer has captured species of the Red-bellied snake in Louisiana, one of them being nearly sixty inches long. It was a fine purplish black on its upper parts, and blotched with a splendid vermilion red on the belly. Its tail ended in a sharp, needle-like spine, which the negroes about New Orleans called a "sting", and the reptile itself a "horn-snake". They contended that it strikes with its tail, and that a prick from its sting is invariably fatal—all of which being utterly false. They live along the wet and swampy bayous, often under old logs or boards which have long laid undisturbed near the water, where it is wet and boggy.

A long chapter might be written about our Hog-nosed snakes (*Heterodon*), pretty specimens of the young of which are presented in Figure 9. They possess the habit of feigning death, and do the trick quite as perfectly as the oldest 'possum that ever tried it. This species is also known as the Puff or Spreading Adder, as the Sand Viper or Blow Snake, and as Flat-headed Adder. They are entirely harmless, and will not even bite when teased to do so, while at the same time they are the most dangerous looking and venomous appearing snakes

we have in our entire snake fauna. Ignorant persons and boys slay them on sight, and brag of the achievement long afterwards. This is a shame, as not only do they feed on toads and frogs, but are most interesting animals to study. When they play "dead", they roll over on their backs; and one may throw them about and handle them in the roughest way—they will keep up the hoax. Doctor Ditmars says he carried one about by its tail for half an hour on one occasion, and it remained as limp as a rag; he adds, however, that it may be led to betray itself "if placed upon the ground on its crawling surface. Then,

like a flash, it turns upon its back again, and once more becomes limp and apparently lifeless. It appears—according to this creature's reasoning—that a snake to look thoroughly dead should be lying on its back."

Being thick-bodied and somewhat sluggish in movement, it is very difficult for the Hog-nosed snake to make its escape when overtaken in the open. The writer once confronted one on a wide, dusty road in the country. In an instant it blew itself up, and flattened out its entire body, including its head and neck—the latter parts being at least three times their usual width. This causes the

colors of the neck to stand out with marked brilliancy, thus giving the reptile a most dangerous appearance, which is in no way diminished by the savage countenance it assumes—the wickedness in its eyes, and its habit of violently puffing out its breath, at the same time assuming an attitude as if to strike, like a rattler.

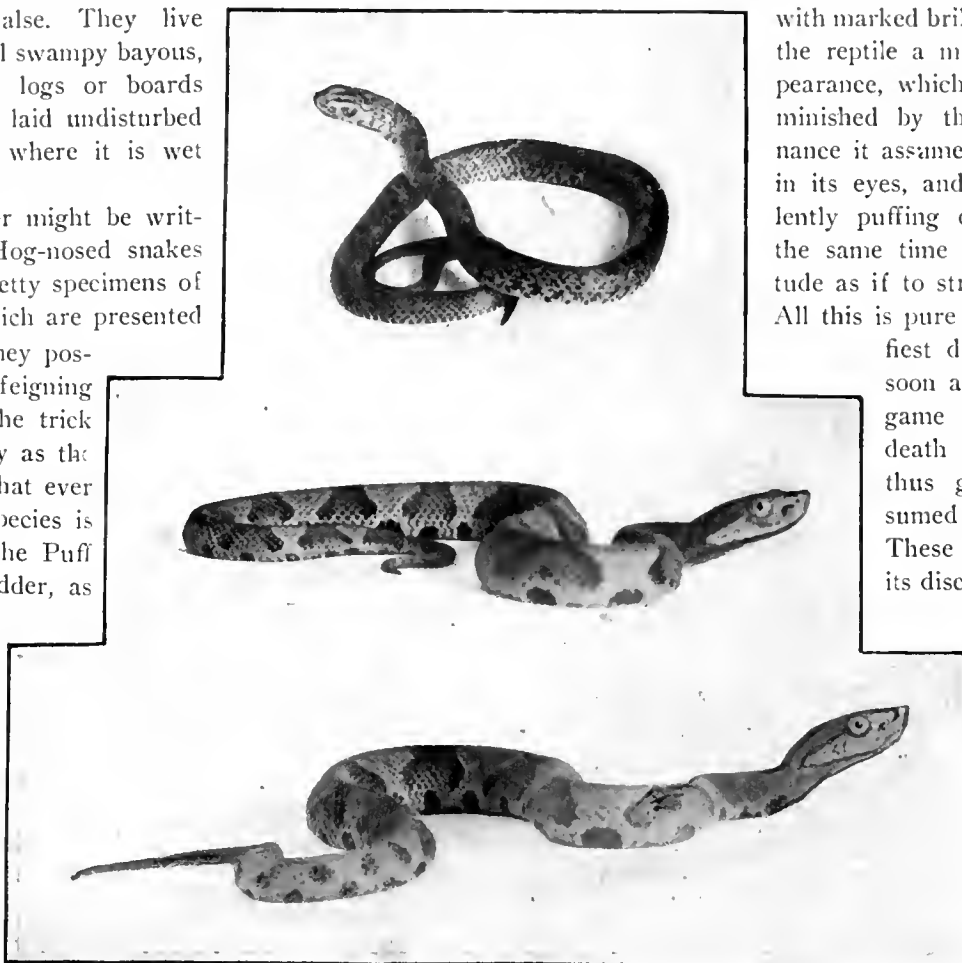
All this is pure bluff of the bluffest description; for as soon as it finds that the game fails, it feigns death immediately, and thus gives all the assumed ferocity away. These antics often cause its discoverer to dispatch

it with a big stone or heavy stick. At the bottom, a Puff Adder is really a most gentle snake, and one need have no fear of picking it up in the midst of its antics of playing the part of one of the world's most deadly vipers,

with fangs an inch long, having on hand ready for injection a full fluid ounce of the deadliest venom known to all snakedom!

Before passing to the venomous snakes proper, it may be pointed out that we have a limbless lizard in the country known as the "Glass snake" (*Ophisaurus ventralis*) (Fig. 7); but as this is in no sense of the word a serpent, space cannot be devoted to its description and history, attractive as both are to any one interested in our animal fauna.

The Harlequin or Coral snakes are known as the Ela-



YOUNG BLACKSNAKE (UPPER) AND COPPERHEAD (TWO LOWER)

Fig. 11. Note the gentle appearance of the young blacksnake and its feeble attitude when coiled, as compared with the venomous Copperhead, where, in the middle cut, it is shown in the attitude it assumes when preparing to strike. Such traits appear in snakes at a very early stage of their existence.

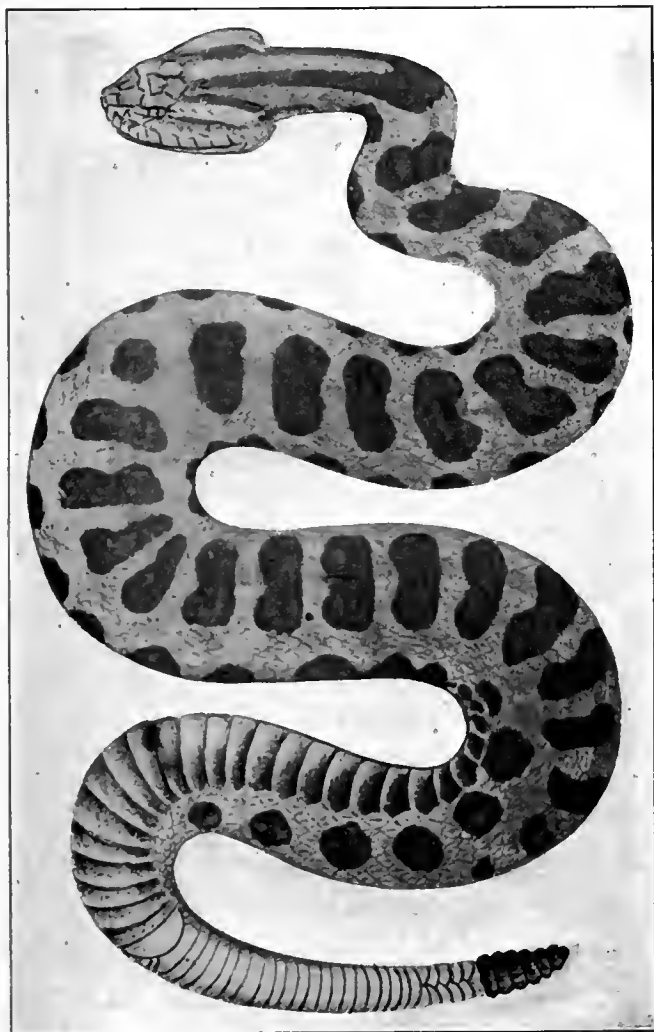
pine Poisonous Snakes, as the principal genus is the genus *Elaps*. The common one (*E. fulvus*) ranges from North Carolina to southern Mexico, and is a brilliantly colored species. It is beautifully ringed with bands of black, yellow and red, and the Sonora Coral Snake from Arizona has the same general appearance, though the arrangement or sequence of the bands or rings are different (Fig. 10). These snakes are dangerous, and the bite of one of them may prove fatal to the human species. This result does not always follow, however; for the writer, when an Associate in Zoology of the Smithsonian Institution, many years ago, examined the thumb of Mr. Horan, the then superintendent of the Museum, shortly after he received a severe bite from a large and healthy Coral snake from Florida; hardly any inconvenience followed as a consequence. However, the thumb was sore for fully a week after the bite was inflicted.

Coral snakes live underground, and are often plowed up in old fields in Florida. They live largely upon



YOUNG OR BLOTCHED CHICKEN SNAKE

Fig. 13. A specimen taken at Great Falls, Maryland, (1916), a species said to heretofore only occur as far north as northern Virginia. A non-venomous reptile, which will, when fullgrown, occasionally catch and devour a chicken.



A MOST VICIOUS SERPENT—THE PRAIRIE RATTLER

Fig. 12. This cut was copied by the writer from the old Report of the Mexican Boundary Survey. The snake represented is a most dangerous and venomous reptile—one of the worst of the genus. It coils quickly, and strikes at an enemy with wonderful energy.

small lizards and snakes, are extremely vicious by nature, and one had better be careful in handling specimens. A few of our entirely harmless serpents so closely resemble *Elaps* that they readily deceive those not familiar with the color-pattern of both, and their behavior when handled. Coral snakes are oviparous.

There is no mistaking a viperine snake in this country, should one be at all familiar with the salient characters that any species of the entire group presents. They all belong in the family *Viperidae*, which is again divided into the *Viperinae*, or the true vipers of the Old World, and the *Crotalinae*, or "Pit Vipers" of the Western Hemisphere. All of our big, thick-bodied, venomous snakes are crotaline ones, or pit vipers. They are called pit vipers for the reason that they have a curious, deep, little pit in front of either eye. The pupil of the latter organ is like a cat's—that is to say, it is a vertical slit-like one, and not round, as in harmless snakes. These crotaline snakes also possess a flat, triangular head in the vast majority of them, that is distinct from the rest of the animal. With but few exceptions, the top of the head is covered with small, granular scales, those on the side having a definite arrangement for the species.

These serpents, as represented in our fauna, have, as a rule, long fangs in the upper jaw that fold backwards against the roof of the mouth when the latter is shut; they are grooved, and on either side connected with a special poison apparatus where the venom is secreted.

The use of the pit in the Pit Vipers is not yet known, although it has been very extensively examined by some



A LARGE BLACK SNAKE IN THE FIRST STAGES OF SHEDDING

Fig. 14. It is a most interesting phenomenon that snakes periodically shed their skins. This is the way a blacksnake looks when the necessity for doing so has arrived. Note the white skin that covers its entire eye, rendering the snake completely blind until the skin is shed.

of our most competent comparative anatomists.

Our representatives of the Viperine group are the Moccasins and the Rattlesnakes, the former having two species, namely, the Copperhead and the Water Moccasin, while in the latter we find about a dozen species of rattlers.

In many books devoted to our snakes will be found excellent descriptions of the poison fangs, the nature of the venom, the anatomy of the entire apparatus, and the treatment of snake-bite, each one of which subjects would require an article to itself for adequate description. Such de-

scriptions generally prove to be quite vague and unsatisfactory, unless thoroughly illustrated by drawings and diagrams. The anatomy and physiology of a rattlesnake's head, for example, would make quite a little book. Many articles and works have been devoted to the moccasins and rattlers of this country, describing their geographical distribution, the number of species and their names, their habits and characters, their ecology and variations, and a



A SIX-FOOT BULL SNAKE FROM TEXAS

Fig. 16. Many names have been given this big, harmless snake, the one of Bull Snake being widely bestowed upon it. Through a modification of one of the structures of its throat, it can, in forceful expiration, make a sound like the bellowing of a bull, or distant thunder. This specimen is shedding; its new skin of black and yellow will shine like porcelain, and the reptile be one of great beauty.

scription. The writer has had many experiences with moccasins and rattlesnakes in many parts of the United States. In a few instances he has had some narrow escapes where he has been far removed from surgical aid, beyond what he could do for himself—sometimes with none of the life saving appliances at hand. On one occasion, when attached as surgeon to a regiment of United States Cavalry operating against the Sioux Indians in Wyoming, he came within an ace, probably, of losing his life from the bite of a Prairie Rattler. After a hard day's ride of over fifty miles, the column went into camp on a broad, level and treeless prairie. The "A-tents" of the officers were, as usual, immediately pitched. In the writer's tent his saddle was placed on the ground to serve as a pillow, and, the weather being cool, a couple of army blankets were spread for his use, the occupant to get between them, one being next the ground, the other to serve as cover. Placing a loaded carbine on one side and an army revolver on the other, the command's surgeon was soon sound asleep between the aforesaid blankets.

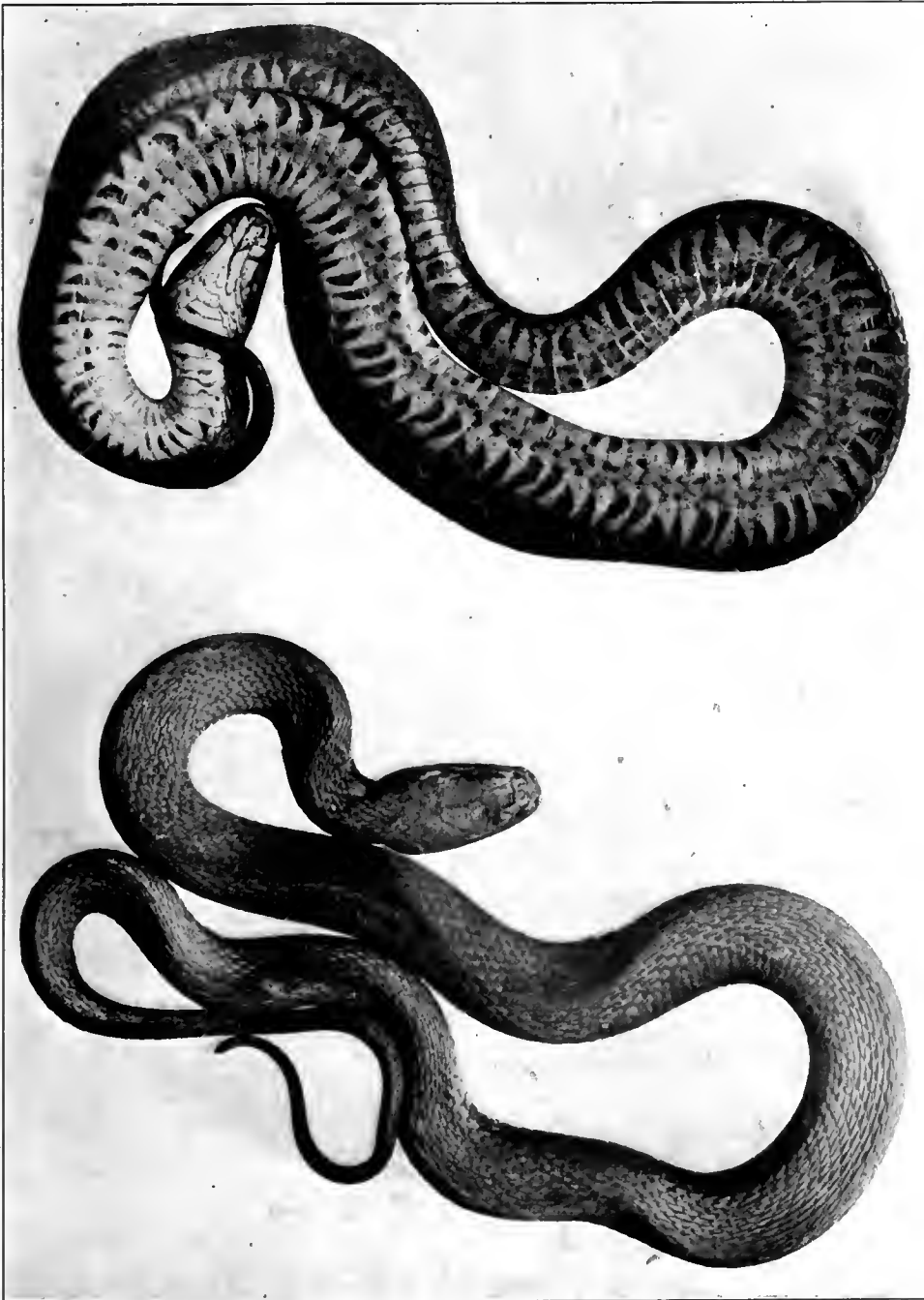
The camp gradually quieted down, and many were enjoying a well-earned rest after the day's march. Pres-

ently the writer became conscious of a peculiar heaving on his chest, with a sense of some few pounds' weight there. Without making any movement, and cautiously opening his eyes, he was confronted with a big Prairie Rattler coiled on the blanket within a few inches of his

face. The serpent had assumed the usual attitude prior to striking; its head was flattened and moved deliberately backward and forward; its eyes possessed a most vicious gleam, and the movement of its belly muscles could be distinctly felt through the blanket.

The position was one demanding great coolness, deliberation and tact. The bite, if given, would be received in the face, and all hope of saving life would be out of the question. All that the writer could do was to whistle to this snake in a peculiar way, in that it might charm it, as it were, and at the same time summon one of the field hospital attendants from without.

Fortunately this ruse succeeded, and in a few moments a young attendant appeared at the door of the tent. At first he was horrified at the plight of his commanding officer, but soon recovered his composure. Between closed teeth, and in a low, monotonous tone, the writer directed him to send two cool men of the Headquarters party to the



BROWN WATER SNAKE, THE LARGEST OF ITS KIND IN NORTH AMERICA

Fig. 15. A big, ill-tempered fellow belonging to a group of perfectly harmless snakes. (Upper cut as viewed from below.) Potomac River swarms with this species of snake, especially along the Virginia shore. This is a six-foot specimen.



SMALLEST RATTLE SNAKE

Fig. 17. This Pigmy Rattler (*Sistrurus miliarius*) was captured in Florida by Mr. F. W. Walker, and photographed from life by the writer. It is of an elegant gray color, beautifully marked with large black blotches down the back, with a series of smaller ones down either side; there is a reddish streak on the back of the head.

tent. They came quickly, and, in the same low, monotonous tone of voice, one was directed to step very deliberately where the saddle lay, the other to remain at the foot of the blanket at the door of the tent. With the greatest possible deliberation each bent down together, and catching the four corners of the blanket, they, with a simultaneous swing, sent the snake skilfully through the door of the tent, out onto the prairie, where it was, in a few moments, shot and cut into mince-meat.

Little sparks from bonfires,
Caused by a careless hand,
Make our giant forests
Into devastated land.

A little care and forethought,
Administered now and then,
Will save our mighty forests
For the benefit of men.

—Daily News, Intermountain District.



National Photo **FOREST PROTECTION WEEK CELEBRATED BY DISTRICT SCHOOLS**

SENATOR FRANK B. WILLIS, of Ohio, spoke to two thousand school children in Rock Creek Park, Washington, D. C., at the American Forestry Association's demonstration for Forest Protection Week, following President Harding's proclamation. Mrs. Susan S. Alburttis, of the Nature Study Department of the Washington schools, was assisted by Smith Riley, Park Forester, and P. J. Joyce, Park Superintendent, in staging the program. Alton Bishop and Barry Bakersmith, of the Ross School, made a "living picture" of the Berryman Cartoon in the *Washington Star* as one of the fea-

tures of the program which follows: Song, "America": Harding's Proclamation, Granville Lief, Central High School; address, Senator Frank B. Willis, of Ohio: "Trees," (Joyce Kilmer), Paul Lewis, Johnson School: "The Song Sparrow," Everett Johnson, Powell School: forest guide rules, Dunbar Forseythe, Cooke School; park pledge, Alton Bishop and Barry Bakersmith, Ross School; song, "America the Beautiful"; salute to the flag; dismissal, "There's a long, Long Trail." To Elaine Hartley was awarded a prize of \$10 for making the best copy of the Berryman "Keep the Parks Clean" cartoon.

THE MEMORIAL TREE

BY CHARLES LATHROP PACK

(From an Address at the New York State Institute of Applied Agriculture, Farmingdale, L. I., May 25, 1921.)

I AM glad to be with you here, my friends. We like to talk together about trees. The trees could tell us much, if they could but speak our language. I like to remember there are trees living in California that discovered America before Christopher Columbus did. Some trees in Africa could perchance tell us of the things they saw and gossip about the pranks of the Queen of Sheba when she visited King Solomon's mines. Trees still living in England very likely sheltered some of the cohorts of Caesar.

Trees have saved the world on two great historic occasions. The trees of the Ark saved life on the earth from destruction. At the Redemption of the World, when Christ died that we might live—and live better—the tree of the Cross was a part of the greatest event of history. So it is very fitting that, like others, today you dedicate trees to commemorate our part in the World War.

This international tree you plant here today is significant indeed, placed as it is in the soil from allied countries and different states of this country. The men you honor with this living growing memorial came together at freedom's call from the ends of the earth. Many have returned again to their places, but some did not return.

Therefore this tree, nurtured by the soil of these many lands, typifies, to my mind, the bonding together of those who died and those who live. As from this soil its roots send forth life so from the sacrifice of those men you honor today there continues to live in the world an idea worth fighting for.

In the ever renewing life of this tree each year the call those men answered is ever kept before us. An

oak it is. In the oak we find sturdiness, steadfastness, strength, all combined as we found it in the characters of those men who asked nothing for themselves, but gave all for others.

Here we have, as Kilmer sang, "A tree that looks at God all day and lifts her leafy arms to pray." As this tree will stand through the years in memory of them, so let it always remind us that we have a task; the task of helping to make this country just a little better place in which to live. They gave their lives to keep what we have and now let us go forward together and ever strive to erect that greatest of all memorials—the better country. Let us every one do our part to make it not just a land of free people, but a country of real folks. That is all the memorial they would ask could they but choose. And speaking of memorials let us not forget that millions of trees have given their lives for this country. That their sacrifice has meant the building of millions of homes, the progress of thousands of industries, the very life of the nation.

This sacrifice is growing every day, every year and yet—what are we doing to memorialize, if I may so express it, these trees? Are we planting trees in their place? Very few, far too few. Are we encouraging natural regrowth of other trees in our forests? Far too little are we doing so.

Let me say in all seriousness that the future life of the nation depends upon our replacing millions of trees which gave their lives to the upbuilding of our country. Forests must be restored, growing forests must be protected. Let us carry the memorial idea to a very practical conclusion, and in place of forests that are gone, let us grow new forests and protect the future of our country.

A "ROOSEVELT PINE" FOR ROOSEVELT'S SON

WRITING to her mother in Washington, Madame Hugli-Camp, of Berne, Switzerland, says:

"Here in Geneva there is a man who can only be described as a character, with a capital 'C'. His name is Henri Correvon, and he lives solely for his plants. His work on Alpine flora is standard and has been translated into all the important languages. In the midst of his garden, which is a marvel of curious and beautiful patches of red Alpine roses, white edelweiss and blue gentians, he has constructed a bit of crumbling old wall, and this he uses to teach the world how to beautify the remains of a vanishing past. In every crevice he has put a tuft of flowering plants and the result of this 'Garden in the Wall' is rare and beautiful. The little man himself is practically on wires, and after bounding from bed to bed in the garden, he swiftly led me to where two young silver pines were growing. 'These are my Roosevelt Pines,' he told me

proudly, 'raised from seed the President gave me, and up there on the side of the Saleve there is now growing a vigorous grove of them, which I planted there at this same time.' In *Asia* magazine for January I read how Meyer, the plant explorer, placed a little Chinese pine on the grave of our Minister to China, W. W. Rockhill, the man who had helped him to procure so many useful Chinese plants for the United States. It occurs to me that it would be a beautiful and appropriate thing to get from Monsieur Correvon a 'Roosevelt Pine' to plant on the grave of the great man's hero son in France. Is the idea practical and can it be laid before a committee who will carry it out? I will here and now answer for the ready acquiescence of the character with a capital 'C.'"

AMERICAN FORESTRY is glad to give endorsement and publicity to Madame Camp's suggestion.

FOREST GUIDE DEPARTMENT

SOLAN L. PARKES, EDITOR

CAMPING

AS I started to write this article on camping, I began to feel crowded between the floor, walls and ceiling of my office. I longed for the open outdoor life, and immediately left for one of my old and favorite camp sites, where on a bluff, fully fifty feet above the shore line of a lake, I sat down with my back placed against the soft side of an aged hemlock, thinking of the camps of the past that I had, sometimes with but a friend or two, and of the camps of larger size, where, having hundreds of boys under my care, I conducted schools of agriculture, horticulture, forestry, etc. I felt gratified that in many years of experience, I had never been compelled to call a doctor for any ill, nor was I ever so unfortunate as to lose a single life from any cause.

I came to the spot where I conducted one of my first camps. Seated on the bluff overlooking the lake, where knowing nothing would disturb my train of thought, except that I could hear the waves lapping against the shore line, see a butterfly with brightly colored wings floating by, or hear the chirping of a chipmunk, when

your camping trip that you are looking forward to, your equipment should be such that you will be absolutely as self-reliant as though you went camping all alone.

The let-me-have-your-comb-habit is a bad one. Borrow nothing. Dandruff, or some other skin disease, may be a part of the lender's personal head adornment.

The same holds true if soap, washcloth or towel is a community affair. Skin diseases may be passed along by this method very easily.

Soap, a comb, washcloth and towels in sufficient number should be your first concern, for personal cleanliness must be your first rule.

Your second concern should be foot comfort, for you will do lots of hiking. Clean stockings should always be waiting for you, as well as dry shoes, for what gives one more comfort than to jump into a pair of shorts, slip on a pair of golf stockings and a pair of tennis shoes or sneakers after a busy day either in play or activity of any kind.

The Editor suggests that all organized groups, whether Boys or Girls, Young Men or Young Women, add the Forest Guide Program to their program; read this department carefully every month; study the advice and information it gives, discuss it, and work out suggested activities, as it is the desire of the Editor that conservation be better understood by the youth of America.

it discovered me in what it considered its domain. At the very edge of the bluff is a deciduous or broad-leaved tree, on which I saw, flitting from one branch to another, a bright-hued cardinal. On a small spur or peninsula, running into the lake, stood a fisherman, slowly trolling his line to attract some finny citizen, while around a bend was a canoe, slowly gliding toward the place where I was sitting. The ozone of the forest filled the air. All in all, it gave one a glorious feeling of contentment.

In such environments as these, it seems to me, somehow, that God intended mankind to live. For one of the first things we read of in the Bible, is the Garden of Eden, where trees are mentioned, together with all else needed to bring happiness.

In that Garden of Eden camp, there was a camp rule, and every camp director, or those that have charge of camps, must govern by rule only, if your camp is to be a success, for, unless this is done, your camp will be a failure.

* * * *

IF you are going to camp this year, do not wait until you are ready to start to make your plans. Begin now. To be assured that you will get all the pleasure out of

Make it a point to have a sufficient number of blankets to keep your body warm. For cool nights come, and often follow a day of rain. The number of blankets depends on the climatic conditions you will camp in. After you have listed and procured that part of the equipment that will assure you bodily comfort, look over that other part you will require for pleasure.

Fishing tackle may have to be repaired, or some parts of it may have to be replaced. Is your Kodak in working? How about your individual drinking cup? Do you have a strong pocket knife? A few good books will help you greatly to pass away an hour now and then.

A good plan is to make up a list of all the equipment you would like to have. After you have the list completed, take a pencil and strike off the list everything you will not need. Then at the very bottom of the list, add needles, thread, extra buttons, shoe laces and a few safety pins.

Your camp shoes should be bought with care. Comfort and wear should both be considered.

Practice to make up your blanket roll. Your soldier brother will be glad to show you how, and remember that you may bring back more than you take along, for you

will always find something that will be interesting to show to your friends when you come home.

* * * *

WHEN you are all packed up and ready to go, plan to make the camp a success, for you will have to play a part.

Perhaps you are going to a camp all built up, or you may go with a troop and build your own. It makes no difference which. It will be your duty to obey the camp rules. Do not bother about the other fellow. Let the one in charge discover the shirker.

The best care should be taken to select a site that has good surface and air drainage. Low, flat meadows look inviting, but are not always the most comfortable on hot, sultry days and nights, while on rainy days the surface often becomes slushy. The early evening dew, and the dampness remaining for a long period in the morning, caused me to avoid meadow sites long ago.

Remember that the other fellows have all the rights in camp that you have. Do not forget to respect them, as you want yours respected. Play your part in camp like a man. Never shirk, for each one will have duties to perform. Some of these may not always be pleasant, and it is up to you, the same as it is to the other fellow, to cheerfully perform all camp duties.

I am going to tell you something that may be good to know. It is only on a camping trip that you get to know the other fellow and that he gets to know you. Too often

you will make of them. Several suits of underwear as well as a bathing suit, should be included, however.

* * * *

LET us for the time being forget the above and talk of what you are going to do.

Swimming—sure; and all other camp pleasures you will have; but you want to learn a lot about trees, birds, insects, flowers and the wild animal life that will be a part of the camp population.

First, buy a well-bound notebook. Write with ink on the front inside cover:

Your name and address.

1921 Camp, located at.....

Arrived(give date)

Left(give date)

At the top of the first page write Trees; on page twenty, Birds; page forty, Insects; page sixty, Wild Animal Life; page eighty, Wild Flowers; and so on.

As you become acquainted with a new tree, write all about it in your notebook. Color of bark, rough or smooth, kind of leaves or needles, where it grew, near water or if on a mountain top. If you do not know, find out if acorns grow on the willow, maple, beech or oak tree.

Find out if the robins, martins, or cat birds like to fly above the water. Why? Study the habits of the birds and what they eat.

It will be interesting to find out if the lily prefers to

Solan L. Parkes:—

Great benefit to forest protection in Pennsylvania has come from the organization and operation of the Forest Guide movement. There are now approximately 11,000 Forest Guides in Pennsylvania. They have measured up fully to their pledge to help protect the forests of the State from fire. The Department has had not only their interest, but very substantial assistance in keeping fire out of the woods and in extinguishing those fires which have occurred. It has remained for the organized youth of the State to display the interest, enthusiasm and effort in forest protection required to put an end to forest fires, and the spirit of the Guides has been contagious in the home, on the streets, and in the woods. We value their co-

R. Y. STUART,

Deputy Commissioner of Forestry for Pennsylvania.

it develops that someone spoils a camp by not playing the game the fifty-fifty way. As a camp director, I never wasted time to teach a shirker what was what. It was of more concern to me to see that the greater number were happy. It never pays to jolly a grouch. It does pay to keep the greater number in good spirits.

Cleanliness must be the first camp law. Unsanitary conditions bring disease, discomfort and ill temper. Camps should be policed at regular intervals.

Your food should be of the best and receive the most careful attention. It should be selected with care and proper storage provided.

I did not mention your outer garments, for this may depend on your purse, the length of your stay, or the use

grow in dry, hard soil, or where it is damp, or in water.

Follow animal tracks. Study their habits. Find out what they eat. Which sleep by day and which by night?

There is a lot to learn.

* * * *

IHAVE always found that campers want to be busy. We built a road into a camp, in fact, a good auto road. We built a rustic fence along the lower edge. We selected trees with broken tops, some that were dead, others where there was over-crowding, and we took the poorest always, for this work.

Result—The Guides learned how roads should be

(Continued on Page 480.)

ACTIVITIES OF THE AMERICAN FORESTRY ASSOCIATION FOR JUNE, 1921

President Charles Lathrop Pack called upon President Harding on June 22, and had a conference upon forestry matters, and upon the necessity for legislative action toward securing a National Forest policy.

* * *

Directors of the Association attended sessions of the forestry committee of the Chamber of Commerce of the United States in New York City on June 27 and 28, to give information on the forestry situation in various parts of the country.

* * * * *

The Stark County Lincoln Highway Memorial Association, of Canton, Ohio, reports the planting of 820 trees and shrubs near the Highway in Stark County, and generously acknowledges the effort as largely inspired by the American Forestry Association.

* * * * *

The Pennsylvania Railroad System was furnished with one hundred reprints of the American Forestry Association's bulletin on Forest Protection Week, which included President Harding's proclamation urging the protection of the forests.

* * * * *

The Universal Engineer Magazine republished in May an article on "Wood in Industry" by Mr. Hu Maxwell from the AMERICAN FORESTRY magazine.

* * * * *

Forest Protection Week as proclaimed by President Harding gave the Association additional opportunity to emphasize the need of fire protection in the forests which it did with a series of forest fire articles in the newspapers. These were printed from one end of the country to the other.

* * * * *

"American Industries," the manufacturers magazine, printed an extended article on the need of a National Forest policy. The editor informs the Association its data was so well prepared that the forest policy article was the only one used in the big convention number that did not touch on that meeting.

* * * * *

"The Banker-Farmer" published an article from the Association on the need of a National Forest policy and its importance to industry and to the banker of the smaller towns.

* * * * *

The South Bend Tribune asks for material for conducting tree planting campaigns which is supplied in series form by the Association. The editor congratulates the Association on the good work it is doing.

* * * * *

The Permanent Builder requested the Association to send it an extended article upon a National Forest policy, to follow its stirring editorial endorsement of the Snell Bill.

* * * * *

With the cooperation of the nature study department of the public schools of Washington, D. C., three thousand children gave a forest protection week demonstration in Rock Creek Park for the Association. Senator Willis was the speaker but the rest of the program was handled by the children.

* * * * *

Basing its plan of work upon advices of the Association the Oklahoma State Forestry Association was organized in June and will at once start an active forestry campaign in that State.

* * * * *

The Secretary attended an important meeting of the Pennsylvania State Forestry Association at Harrisburg at which were discussed plans for the creation of the Allegheny National Forest in North-western Pennsylvania.

* * * * *

The Board of Directors of the Association held two meetings in New York City to discuss forestry measures, and also the development of the magazine and the extension in various ways of the Association's work.

* * * * *

Increased interest in forestry resulted in the Association securing over 1300 new members during the first six months of the year.

FORESTRY IN PENNSYLVANIA

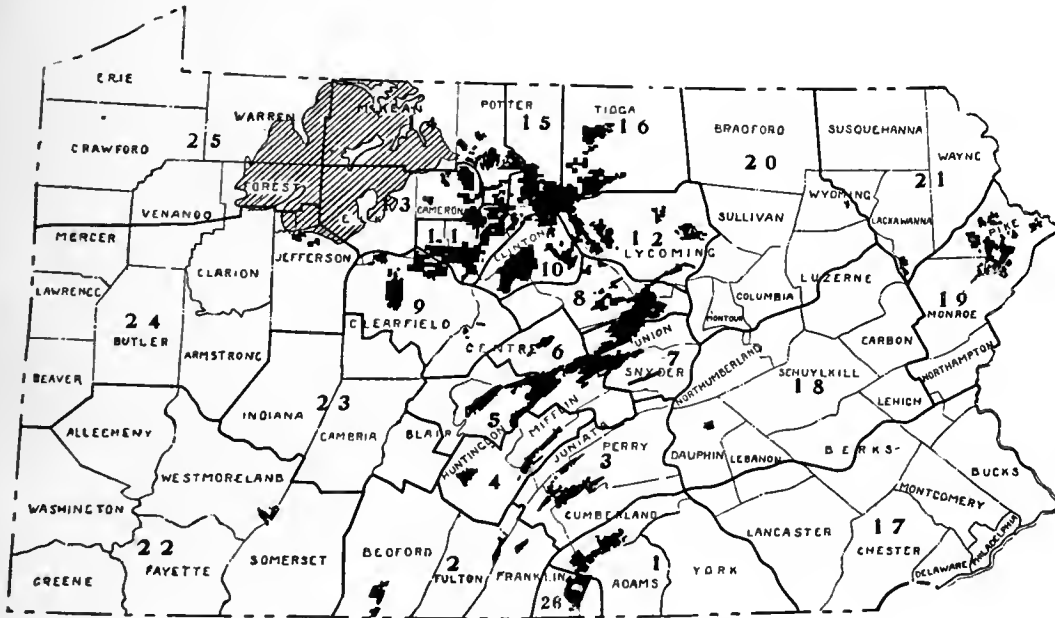
MOST successful was the meeting of the Pennsylvania Forestry Association at Pittsburg on June 16 and 17; successful in concentrating attention on the need of acquisition by the Government of a forest area of 1,000,000 acres in the northwestern part of the State to protect the watershed of the Allegheny River, and successful also in emphasizing the progress of forestry in the State.

Dr. Henry S. Drinker, president of the Association, in opening the meeting said:

"Founded at Philadelphia in 1886 the association has for 35 years continuously labored to interest our people in the study of this question, so important to our comforts and to our industrial interests, and to impress upon our legislators and State officials their duty—to take efficient measures for the conservation and care of our tim-

ber supplies for the future. And at the head of our Forestry Department we have Gifford Pinchot, a man who has given and is giving a life's devotion to the cause, and whose energy and trained and wise direction of the forestry interests of the State shows large results already accomplished and bear the promise and potency of great accomplishment in the future. The forestry question is one of great present interest to Pittsburg and the Pennsylvania Forestry Association has stood behind Mr. Pinchot in his successful effort before the legislature during the past winter to obtain the legislation asked by your Flood Commission and supported by your Chamber of Commerce, looking to the establishment of conditions at the head-waters of your streams to lessen and to do away with the floods that have done so much damage to Pittsburg at periods in the past.

"Passing beyond the borders of our own State, we find the great Chamber of Commerce of the United States taking the same active stand nationally in regard to forestry that your Pittsburg Chamber of Commerce is taking in regard to your local needs. The National Chamber has appointed and formed an Advisory Committee of men versed in the various phases of the forestry question—Fire Protection, Reproduction of Timber, the Acquisition of



GOVERNMENT TO BUY 1,000,000 PENNSYLVANIA ACRES

The area in light grey in the northwestern section of the state comprises an area of forest land to be acquired by the Government to protect the head waters of the Allegheny River and to develop as a renewal forest. The areas in black indicate location of State forest land.

berlands and for the reproduction of timber on lands from which matured timber has been cut and used.

"For years in the early stages of the forestry cult it was looked on by many as being rather a fad of nature lovers than a matter of great financial and industrial importance to our State; but the great lessening in recent years of the available supply of timber, and its constantly increasing cost, in bringing home to our people the lesson that the early pioneers of the forestry movement, Dr. Rothrock, Dr. Elliott, and their associates, sought to enforce.

"Today we are fortunate in having as the Governor of Pennsylvania a man of large business experience and broad vision, who is doing all that the finances of the State will permit to support the State Forestry Department in its work of protecting our woods from destruc-

tion by fire, and of reproducing on our State lands timber supplies for the future. And at the head of our Forestry Department we have Gifford Pinchot, a man who has given and is giving a life's devotion to the cause, and whose energy and trained and wise direction of the forestry interests of the State shows large results already accomplished and bear the promise and potency of great accomplishment in the future. The forestry question is one of great present interest to Pittsburg and the Pennsylvania Forestry Association has stood behind Mr. Pinchot in his successful effort before the legislature during the past winter to obtain the legislation asked by your Flood Commission and supported by your Chamber of Commerce, looking to the establishment of conditions at the head-waters of your streams to lessen and to do away with the floods that have done so much damage to Pittsburg at periods in the past.

State Reservations of Timber, Timberland Taxation, and other matters—who are asked to make a nationwide study of the whole question for consideration by the National Chamber of Commerce and for reference by referendum to its many constituent Chambers throughout the country, with a view to formulating a national policy in regard to our National forestry interests, to be advocated before Congress and before the legislatures of the several States—a broad, important, patriotic movement, likely to be of great good to the country. The forestry movement has an importance and a momentum that is bound to bring forth great and useful results and you do well to give it your interest and support."

Addresses were made by Hon. John M. Phillips, a State Game Commissioner; E. K. Morse, of the Pittsburg Flood Commission; Gifford Pinchot, Joseph S. Il-

lick, George H. Wirt and R. Y. Stuart, of the State Department of Forestry; Dr. Filibert Roth, Professor of Forestry, University of Michigan; W. B. McCaleb, in charge of water supply for the Pennsylvania Railroad; Major E. A. Ziegler, of the State Forest Academy; Dr. J. T. Rothrock, the father of Pennsylvania's forestry progress; P. S. Ridsdale, Secretary of the American Forestry Association, and others.

What the forestry situation in Pennsylvania has been and is, is well told in a statement distributed at the meeting, which says:

"Pennsylvania's primeval forests were once the glory of the State. They are practically gone today. The annual forest product of Pennsylvania once exceeded in money value that of any other State in the Union. It is no longer a figure in the lumber market.

"Because these forests have been destroyed, we suffer a financial loss every year of not less than \$80,000,000. Sum it up thus:

For lumber which we buy elsewhere.....	\$50,000,000
For freight on that lumber.....	25,000,000
For loss in wages paid to labor.....	5,000,000
	\$80,000,000

"Add to this the annual loss from forest fires, the frequent loss by destructive freshets, the closing of wood-working industries, and it would be a conservative statement to say that Pennsylvania's loss due to her vanished forests is not less than \$100,000,000 each and every year—as much as it has cost to conduct the State Government for two years.

"Until Pennsylvania again produces the timber required for home use, this drain upon the Commonwealth will continue. The very best home grown timber formerly cost from seven to eight dollars a thousand feet. We now pay \$53 per thousand feet at the mill, and the freight from Oregon to Pennsylvania in addition.

"It is estimated that Pennsylvania uses each year about two and one-half billion feet, board measure, of lumber, but is producing only about one-ninth as much.

"Pennsylvania could produce lumber for home use and have a considerable volume for sale to other states.

"Without wood, every leading industry in the State would be halted.

"Six million acres in our State are producing no crops, and are suitable for growth of timber only. To restore them to growing timber, first prevent forest fires, then replant them with useful forest trees. There is no other way by which we can furnish the timber our industries require, or can diminish the loss to our State that is caused by lack of growing forests within State limits.

"Our failure to begin restoration of our forests means hardship for those who follow us.

"The above is serious enough, but it is only a part of the

forest problem.

"If we had lumber of suitable kind, in proper shape, in sufficient quantity, given to us, without cost, and at the points in the State where it was needed, it would not produce all that we need for our comfort, health and happiness. Without living, growing trees on these unproductive lands, Pennsylvania would become progressively poorer and life would become harder.

"In ten years our supply of lumber from the Southern States will cease. That from the Northwest will end twenty years later and the United States must seek its supply from some foreign country. Every industry of this State is already suffering from lumber shortage due to high price, which will increase at the years pass.

"When a far-sighted organization like the Pennsylvania Railroad sends aviators to South America to explore forests for ties we know that the situation is serious.

"It is hard to prove that trees increase the rain or snow fall; but there is no doubt that large bodies of timber aid in saving what does fall.

"In the absence of forests, our permanent supply of water is becoming shorter. It is an established fact that to obtain a steady supply of water in our wells, we must dig deeper than formerly. And this is true over so wide an area, that it indicates very serious conditions in the future.

"Land under cultivation here usually freezes so hard in winter that most of the rain or melting snow runs off of the surface instead of soaking into the ground. The forest floor (*if fires be kept off*) is covered with leaves which retain the heat of the earth, and which, by their own decay, furnish heat so that the soil is not frozen. This allows the water to soak into the ground. It is, therefore, clear that our forests furnish most of the water that comes to us during late autumn, winter and early spring.

"There never can be a desert where there is a forest!

"Every business interest in Pittsburg and in the valley of the Allegheny demands that what water falls should be, so far as possible, under control to guard against damage from floods and to maintain navigation in periods of drought.

"Without an abundant supply of pure water, neither health, comfort nor decency is possible anywhere, and so far as we now see, the only possible aid that we can render in having and in retaining enough of it, must come through the forest.

"Forestry, therefore, concerns every home. A realization of this fact has at last become general. Over our entire State a new interest has been awakened. Your need of a large State Forest for Pittsburg is as great as that of Harrisburg or Philadelphia, and your claims upon the State for it are as great as those of the East, which have, in great measure, been granted.

OAKS FOR ORNAMENTAL PLANTING

BY F. L. MULFORD

IN the normal human being there is an innate love of natural objects, both animals and plants. The young child who has not been scared by foolish caretakers is interested in the small animals that come within its ken, and all expect children to want to pick the buttercups and

that large trees may be used for shade about the home.

It is fortunate that this is true as so many people are condemned to live in cities nearly all their lives, and of those who are so fortunate as to live in the country many live in regions where there are but few trees except those they bring about the homes.

In other cases the rich natural growths are destroyed to make way for farming, so that the farmstead, and occasionally a stream bank or a fence row are the only places where good trees may be seen close at hand.

Interest in these home plantings is greatly increased if the trees are selected with a view to their individual beauty and appropriateness for the locality, as well as to give an air of naturalness and comfort to the home surroundings. Too often such trees have been selected primarily because they were a trifle more rapid in growth than other kinds, or because it was the

style in the community. Less often trees have been selected because they were foreign to the region or the conditions and showed this markedly in some prominent



THE LIVE OAK

The magnificent live oak avenues of the South indicate that past generations did not hesitate to use this species despite the fact that it is slower in growth than some other kinds.

daisies to say nothing of the dandelions. It is only children who are brought up under sordid city conditions, or those who are brought up by people so thoroughly obsessed with material things that they continually crush the natural in childhood, that do not carry this love into mature years.

Though most people have in them the power of loving nature, yet because of lack of sufficient knowledge to really know a few plants and their characteristics, they do not have the interest and get the enjoyment they otherwise might.

Although it is an added enjoyment to those who know and love trees to be able to go out into the woods and fields, and even into the forests and mountains, yet much of enjoyment may be gained in city parks and on home grounds, especially where the latter are somewhat liberal in extent, so



THE WILLOW OAK

The willow oak holds its leaves well into the winter in the states near the Gulf of Mexico, but drops its leaves early in the section north of Washington and Louisville.

characteristic. In many of our American styles we have been prone to ape European models. In the recent past it has been more conspicuously true in dress than possibly in some other particulars. Our architecture is full of it, especially our home architecture, although there are a few well-adapted American types, as the colonial homes seen respectively in New England, in New York, in Pennsylvania, along the coast in the South and inland regions in the the South. For home ground adornment European plants have been much used and it was not until our American wild plants were taken to Europe and sent back to us that we really began to use them, and even now the native material is not often valued at its true worth for planting purposes. Among the best of trees for ornamental planting

in this country are the native oaks. They are handsome trees, with species adapted to all parts of the country. They may appropriately be used on the home grounds, in parks, along country roads, and on city streets. The suggestion to plant oaks frequently brings as a response the statement that they are too slow in growth. There is a



PIN OAK AS A STREET TREE

While not as good a street tree as the red oak it is much better than poplars or silver maple. It thrives on heavy clay soils as well as on those much lighter.

germ of truth in this as the white oak and the live oak do not grow as rapidly as many other trees. The magnificent live oak avenues of the South attest the fact that past generations did not hesitate to use this tree because it was slower in growth than some other kinds. The symmetrical placing of specimens of them near some of the

old houses indicates that they have been planted there. In many cases the arrangement of the trees is too regular to have been the result of placing the house with reference to trees already in existence.

Although the white oak has the reputation of being a slow growing tree and is much slower than many other oaks, yet it is about as rapid a grower as the sugar maple. But the sugar maple is much planted, even though it is widely known to be of slower growth than the silver maple.

The oak may be regarded as the most typical American tree. It is widely distributed throughout the United States, it being represented by one species or another practically wherever woody growth ex-



THE RED OAK

The red oak is a useful ornamental tree except in those regions approaching sub-tropical conditions or where rainfall is deficient and irrigation is not practical.

ists. It is represented by large growing species in the regions more favorable for tree growth, and in the drier parts of the country it is represented in the chaparral by dwarf kinds. The same species may take on different forms under different conditions. For example, the coast live oak of California, which is an entirely different tree from the live oak of the southeastern states, ordinarily attains a large size, but on the wind swept coast near Monterey Bay, California, it forms wedge-shaped bushes or small trees, with the sharp edge of the wedge towards the ocean from whence the strong winds come. The lower limbs on this side will be on the ground possibly almost buried by sand.

The next limbs above will be somewhat shorter and most of their growth will be in the lee of the bottom limbs. On the other side of the tree the growth more nearly resembles an ordinary tree.

Although most American oaks are deciduous there are also evergreen and part evergreen species. The live oak of the southeastern United States and the valley oak and the coast live oak of California are evergreen. The laurel oak is practically evergreen near

the Gulf of Mexico but becomes deciduous farther north. The willow oak holds its leaves well into the winter in the states near the Gulf of Mexico, but drops its leaves early in the neighborhood of Washington and Louisville.

Of American trees the oak is one of the most worthy of consideration because of its strength, beauty and general worth. The white oak is widely distributed throughout the eastern two-thirds of the United States and is throughout its range a notably handsome and useful tree. In the coastal plain region from Norfolk to Galveston the name oak suggests first of all the live oak, which is quite different in form and general appearance from the white

oak, and yet gives the same impression of strength and dignity. In California the valley oak occupies a similar place to that occupied by the white oak and live oak in other parts of the country. Specimens of all these trees reach a large size. A white oak in the Friends' graveyard, at Salem, New Jersey, has a spread of branches of 123 feet. The Hooker Oak, at Chico, California, a specimen of the valley oak, has a spread of 130 feet and a girth of 27 feet. Live oaks of about the same size may be seen in Audubon Park, New Orleans, Louisiana, and in other parts of the Southern States.

For purposes of discussion oaks divide themselves

roughly into four rather distinct groups: First, those with large leaves and rounded lobes as exemplified by the white oak; second, those with large leaves and prickles on the ends of the lobes as exemplified by the red oak and pin oak. Both of these groups are widely distributed throughout the eastern half of the country. The third group are those trees with small leaves and mostly smooth edges as exemplified by the live oak and the willow oak, while the



THE BLACK OAK

This oak is difficult to distinguish from the red oak. They are similar in other respects and the black can be used under the same conditions as the red, and will give the same service.

fourth group includes the California oaks, the valley oak and the coast live oak.

The young leaves on the oaks were in most places this abnormally early season, large enough so that the form could be recognized. It was, therefore, a good time for those interested in studying the oaks, or those desirous of selecting a satisfactory tree for fall planting, to try to learn to distinguish the different kinds growing in their locality. As a help in this direction characteristic leaves of a few kinds are illustrated.

As already stated the white oak probably heads the list of desirable trees to plant, not because it is a better tree

than the live oak or the valley oak, but because it is adapted to so much wider range of territory. It is native as far west as Kansas, Nebraska and Oklahoma, and may be grown wherever sufficient moisture can be supplied. It thrives in western Oregon and Washington, but is not common near the South Atlantic and Gulf coasts. This is probably more due to soil conditions than to climatic conditions. Because of the excellence of the live oak, laurel oak and willow oak, which do especially well in this region, the white oak is not missed. It forms a broad rounded head when allowed to develop without being

c r o w d e d, its lower limbs extending horizontally without much tendency to droop.

Because of this and its slower growth it has not been used much as a street tree. Its bark is very light colored and somewhat rough. Its leaves have a tendency to hang on well into the winter. It is deserving of much more extended planting as a lawn and park tree than has been the practice.

The red oak is a useful ornamental tree except in those regions approaching sub-tropical conditions or where rainfall

is deficient and irrigation is not practical. Its leaves are large, dark, shiny green, and the lobes have prickles at the ends. Its foliage assumes a dark red hue in the autumn. It is a rapid growing tree, trees three years planted on the streets of Washington, D. C., having made a growth of four feet in one season. It likes heavy soils and responds to good care. It forms a large oval top and its branches are inclined to be upright. Its bark is dark greenish gray and smooth.

It is one of the few trees that thrive well close to the ocean, being one of a half-dozen that come in naturally

on newly formed islands along the Atlantic Coast. This suggests its use for all types of ornamental planting near the ocean and it may suggest its adaptability for use upon slightly alkaline soils. However, as it is not well adapted to semi-arid conditions this character would not be likely to be of value as the application of sufficient water to insure its growth would probably eliminate the alkalinity.

It is admirably suited for lawns and parks as well as for roadside planting and city streets. It should be planted instead of silver maples, where the use of the latter is contemplated. The red oak and the black oak are rather

difficult to distinguish from one another in many of their forms, but for all practical purposes there is no need for such distinction.

The pin oak is another of the large-leaved oaks with prickles. It is often found in more moist situations than other oaks in the northern states and so is sometimes called swamp oak. Its leaves are more finely cut than those of the red oak and are apt to be smaller. They are a dark glossy green, turning a brilliant red in the fall, and usually hang on all winter after

turning brown. The pin oak makes a large oval-headed tree, but the lower branches have a tendency to droop with age. It is handsome, giving a more airy general effect than the red oak. It is especially adapted to lawn and park planting, and also for country roads and city streets, although for the latter purpose its value as compared with the red oak is over-rated; but it is much better than poplars or silver maples even as a street tree. It thrives on heavy clay soils as well as on those much lighter.

The scarlet oak is somewhat intermediate in foliage be-



THE WHITE OAK

Although the white oak has the reputation of being a slow growing tree, and is slower than many other oaks, it is as rapid a grower as the sugar maple.

tween the pin oak and the red oak, and is found native with the others except on the lowest ground and is especially abundant on gravelly or drier soils. It is a round-headed tree with branches spreading without a tendency to droop. The name comes from the brilliancy of color-



THE PIN OAK

This oak can readily be identified because its leaves are a dark glossy green, and also because they usually hang on all winter.

ing of the autumn foliage. Its leaves do not hang to the tree after maturity as in the case of the pin oak. It is a desirable tree for lawns, parks and roadside planting. It has been but little used as a street tree and possibly may not be adapted to that use except on gravelly soils.

The Spanish oak is another good tree with foliage of the same general character as the red oak. It is not native as far north as the red oak, and is more common in many parts of the South. It is a more upright tree, with an oval top. It seems to withstand city conditions well and should be tried as a street tree. It is useful on lawns, in parks and along country roads.

The live oak is the most striking representative of the small leaved group and as already indicated is the most important shade tree near the coast from Norfolk to Galveston and beyond. When mature it is a broad spreading tree and when grown on lawns or in parks the branches often come close to the ground, although owing to its good proportions they really are not as low as they at first appear. The leaves are about one

and a half inches long and have smooth edges. They are sometimes broader near the apex. The tree being ever-green is a little harder to transplant than the other southern oaks but it is well worth the extra trouble. Like all oaks they respond to liberal feeding and good care. It is good alike for lawns, parks, roadside and street planting, but on account of its size should be allowed plenty of room. The foliage often becomes dull and rusty before the new leaves appear.

The next most important of the southern oaks is the willow oak. The name comes from the similarity of the leaf to that of the willow. It is also called water oak which name it shares with two other trees, the laurel oak and the true water oak. In a few places it is also called pin oak. It is a large handsome round headed tree native from eastern Texas to southern Maryland and up the Mississippi Valley into Kentucky. It is one of the most important shade trees in all this region even including those portions where the live oak thrives.

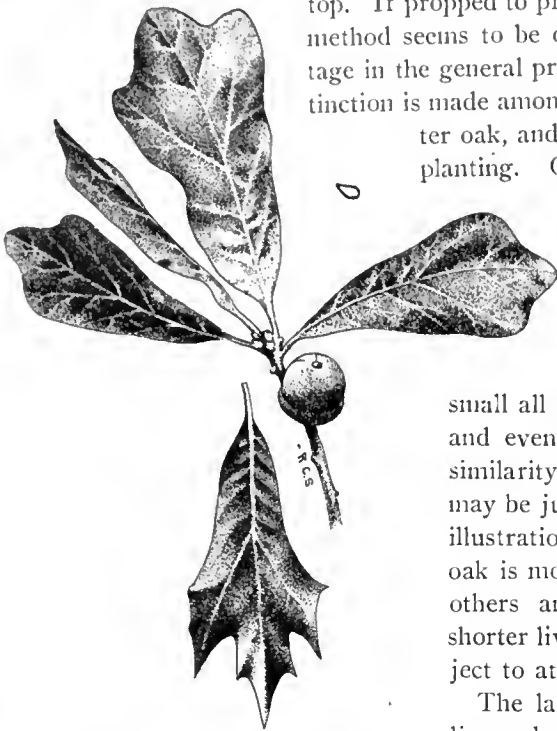


THE SCARLET OAK

This is not adapted for a street tree but it does very well on gravelly soil and is desirable for lawns, parks and roadside planting.

It is suitable for lawns, parks, streets, and roadsides. Most of these trees are dug from the woods and swamps in not too careful a manner and the top is cut off so that the tree when set looks like an overgrown bean pole 12 or 15 feet high and often two inches through at the

top. If propped to prevent swaying in the wind this method seems to be quite successful. A disadvantage in the general practice, however, is that no distinction is made among the three trees known as water oak, and all may be mixed in the same planting. Out of leaf these trees when



LEAVES OF THE WATER OAK

This is called the weed among the oaks, and the tree should never be planted in place of the willow oak, or the laurel oak, both of which are better trees.

introduced into cultivation as the Darlington oak. It is an excellent variety. The tree is large, oval-headed and upright. It is adapted to use on lawns, in parks, and on roadsides, and should be tested on city streets.

The water oak is the weed of the oaks. It is much poorer for ornamental plantings than either of the other two trees with which it shares its name, that is the willow oak and the laurel oak. It should not be planted as it has no advantages over the two other trees and does have disadvantages.

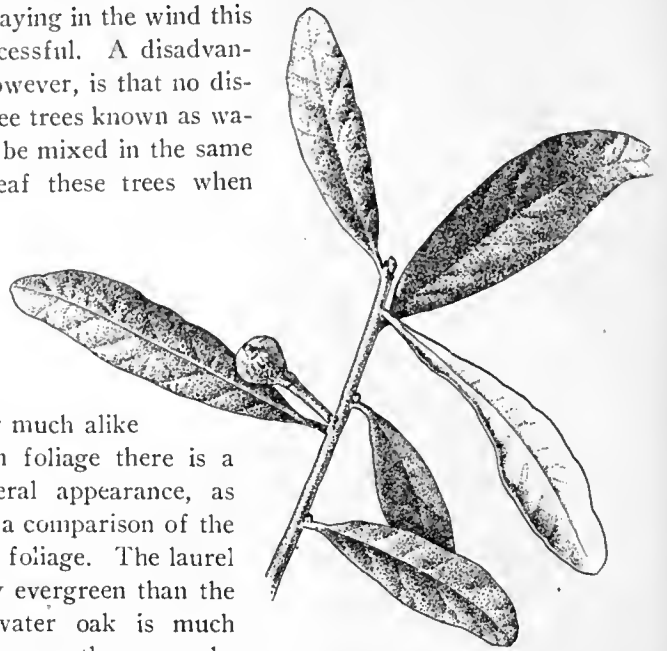
The two principal California oaks are the valley oak and the coast live oak. Both have two kinds of leaves, one being like small holly leaves and the other being about the same size, but with a smooth edge. Both kinds are on the same tree at the same time. The coast live oak is native to the western slope of the coast range of mountains, while the valley oak is native to the Sacramento and San Joaquin valleys. Both are large handsome trees, each suited to planting in the region to which it is native. The valley oak can be used close to the coast, but it is questionable whether the coast live oak would succeed in the greater range of

temperature and less humid climate of the valleys. They are adapted to lawn, park, and roadside planting and apparently are succeeding as street trees in their respective regions. Success in transplanting is most likely by using only plants grown in pots or cans. They need careful watering until well established.



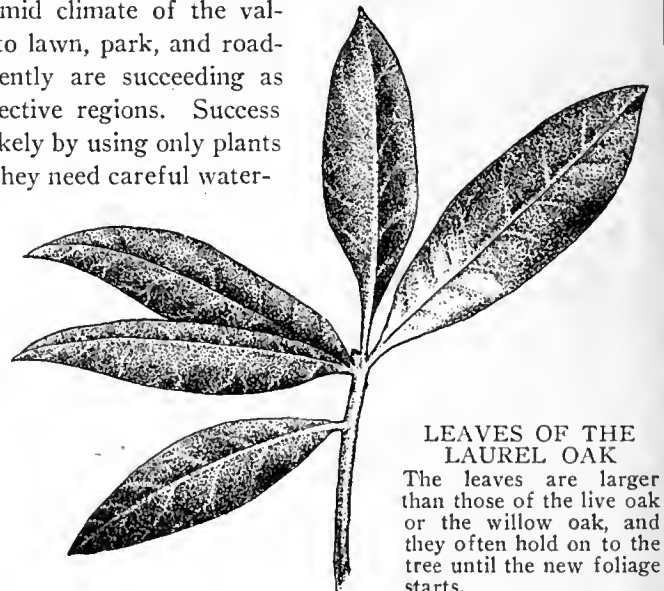
LEAVES OF THE WILLOW OAK

The name comes from the similarity of this leaf with that of the willow. It is also called the water oak and, in a few places the pin oak.



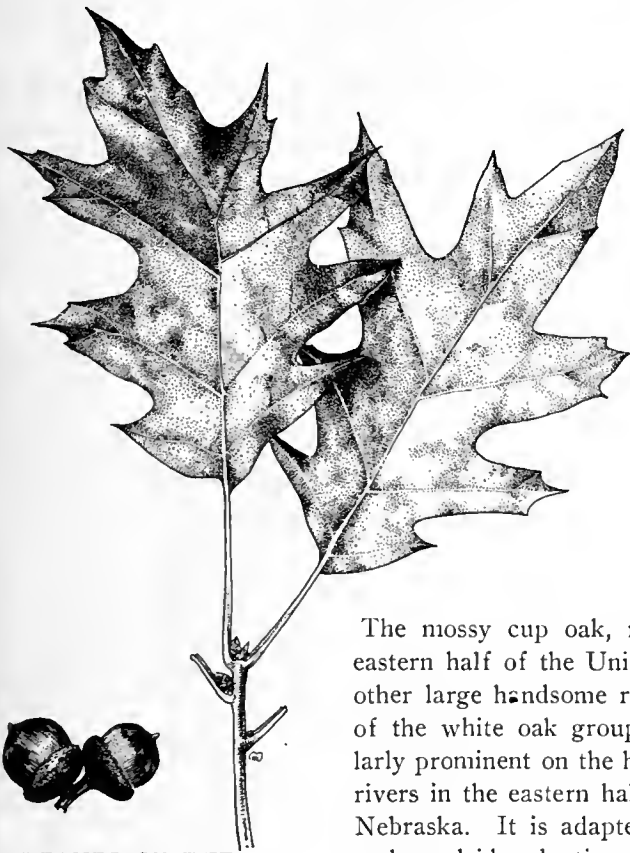
LEAVES OF LIVE OAK

The leaves are about one and a half inches long, and have smooth edges and are sometimes broader near the apex.



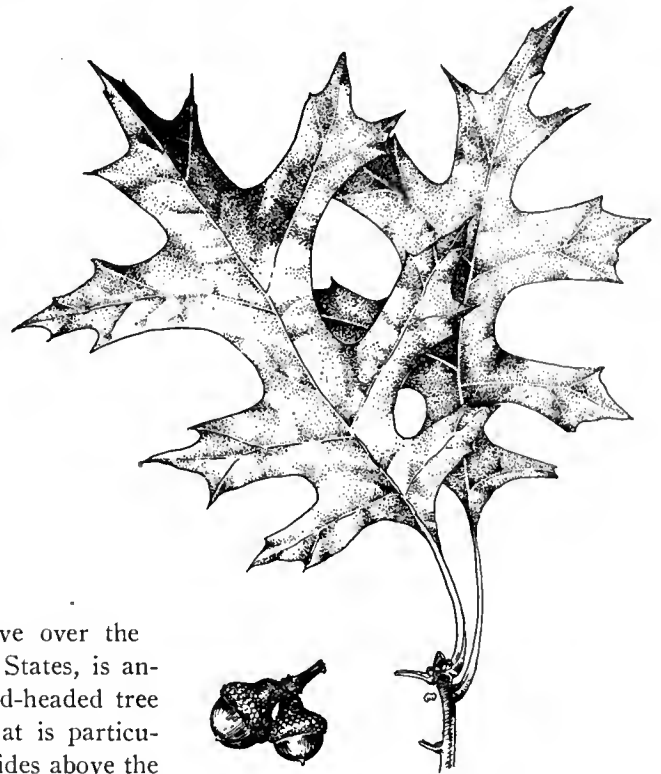
LEAVES OF THE LAUREL OAK

The leaves are larger than those of the live oak or the willow oak, and they often hold on to the tree until the new foliage starts.



LEAVES OF THE RED OAK

The leaves are large and in color a dark, shiny green and the lobes have prickles on the ends. They turn a dark red in autumn.

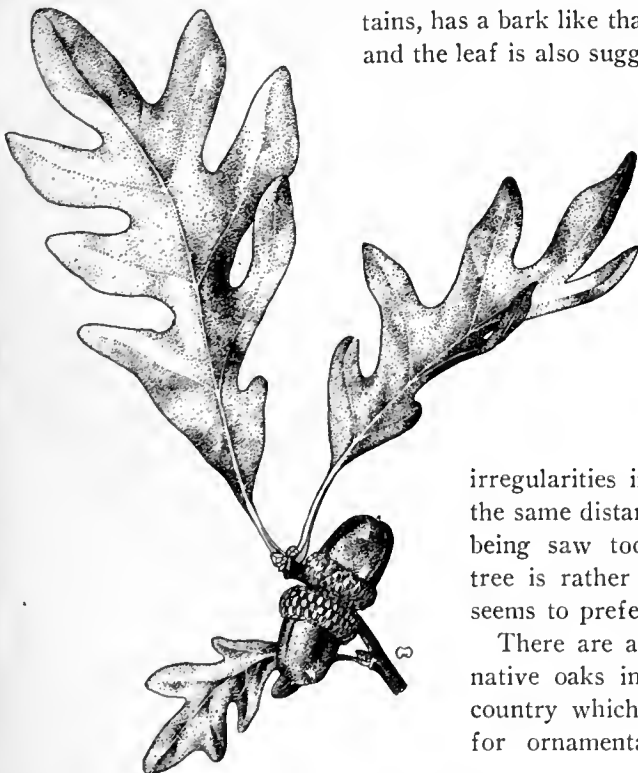


LEAVES OF THE PIN OAK

The leaves are more finely cut than the red oak and are smaller. They are a brilliant red in the autumn and usually hang on all winter.

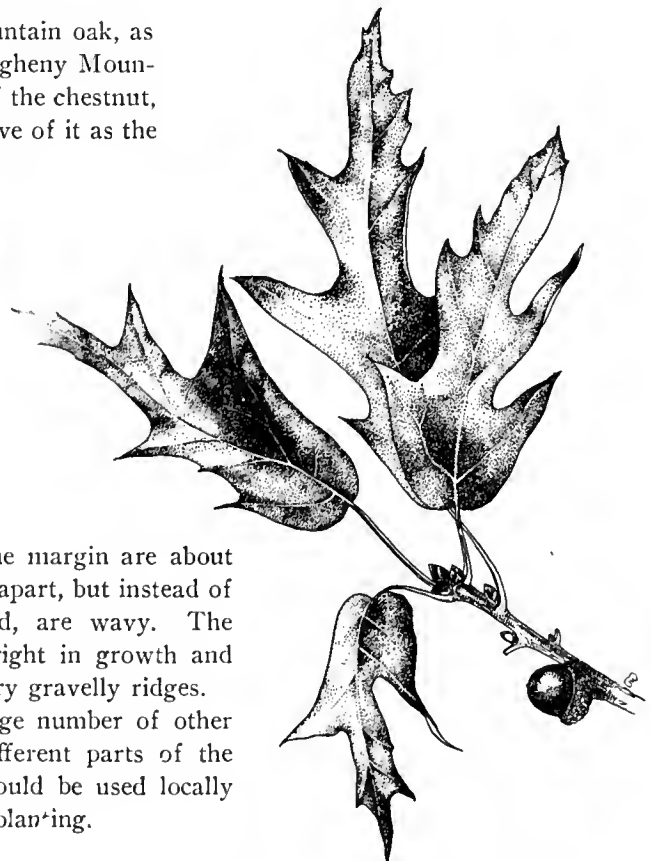
The mossy cup oak, native over the eastern half of the United States, is another large handsome round-headed tree of the white oak group that is particularly prominent on the hillsides above the rivers in the eastern half of Kansas and Nebraska. It is adapted to lawn, park, and roadside plantings and may prove useful on city streets. It should be frequently planted near the borders of the dry farming country.

The chestnut oak, or mountain oak, as it is often called in the Allegheny Mountains, has a bark like that of the chestnut, and the leaf is also suggestive of it as the



LEAVES OF THE WHITE OAK

The leaves have a tendency to hang on well into the winter, and the tree is very well known because of its wide range of territory.



LEAVES OF THE SPANISH OAK

The leaves are of much the same character as the red oak, but the tree is better known in the South than in the North.

irregularities in the margin are about the same distance apart, but instead of being saw toothed, are wavy. The tree is rather upright in growth and seems to prefer dry gravelly ridges.

There are a large number of other native oaks in different parts of the country which should be used locally for ornamental planting.

BICYCLE HIKERS URGE MEMORIAL TREE PLANTING

UNIQUE and interesting and productive of fine results in the interest of Memorial Tree Planting was the Fourth Annual Bicycle Hike given by Camp Wildwood during the past summer.



Some of the boys who took the hike and who succeeded in arousing enthusiastic interest in Memorial Tree Planting all along the line from Pittsburgh to Gettysburg.

The Camp is composed of boys of the Pittsburgh District, under the organization of F. C. Copp, who is an instructor in the City Schools of that city, and the membership of the Camp is composed of a group of manly boys who are interested in civic matters in general and who are promoters of the "See America First" movement.

Mr. Copp is a member of the Allegheny County Civic Club, Sons of the American Revolution, and the Pittsburgh Board of Trade. He has for the past four years assembled a group of hardy boys for their summer vacation—boys who take a deep interest in the things which make for a better citizenship for both the State and Nation. The trip of 1920 was made chiefly in the interest of and for the stimulation of the promotion of Memorial Tree Planting and the hand folder sent out to the prospective hikers over the trail was headed "MEMORIAL TREES."

A party of twenty-six boys between the ages of 12 and 16 years, and four men counsellors, left Pittsburgh, Pennsylvania, on Monday morning, July 12, on bicycles, bound for the State Capitol, Harrisburg, Pennsylvania, via Bedford, Chambersburg and Gettysburg, over the Lincoln Highway. The baggage of the party and the literature to be distributed was carried in an automobile driven by F. C.

Copp, accompanied by Bernard Otterman, of Wilkesburg, Pennsylvania.

At the end of the fifth day the party arrived at Gettysburg, Pennsylvania, where a two-day stop was made to visit the historic Battlefield which saw the turning point in the Civil War. While in this city the boys slept two night upon the Battlefield. As one boy said after the trip, "I slept the sleep of sleeps and snored the snore of snores, those nights up in the Allegheny Mountains under the fragrant balsams and pines." The hikers were received by Governor Sproul.

During the hike the party distributed thousands of pamphlets for the American Forestry Association, of Washington, D. C., urging the planting of memorial trees. They were received with great ovation and welcome wherever they visited and another hike for this summer is planned by Mr. Copp and his boys.

Booming Down the Canyon

*The ranger sat in his cabin door,
With eyes that were swollen and lungs that were sore,
While under his breath he bitterly swore,
For—she was booming down the canyon.*

*The tourists who left two days before
Will never visit their camp site more,
Nor gaze on the scenes they used to adore,
For—she's booming down the canyon.*

*A few little sparks by a tree, quite dead—
Just a few live coals that were "out" they said—
Now look at her going, roaring and red,
A-booming down the canyon.*

*Forty good men, husky and strong,
Worked like demons all the day long;
But she crowned and went over—again she has gone,
A-booming down the canyon.*

*How long it may burn or where it may go,
Are a couple of things that no one can know;
But it won't be all out till we get lots of snow,
For—she's booming down the canyon.*

*Hundreds of years to grow those trees;
Those same live coals and—a little breeze,
Then waste and desolation are all one sees,
As she goes booming down the canyon.*

*The ranger sat in his cabin door
With eyes that were bloodshot and lungs that were sore,
And at someone's gross carelessness bitterly swore,
For—she was booming down the canyon.*

—REMINGTON ELLIS.

FOREST PROTECTION ACTIVITIES

Reports from all sections indicate a favorable fire situation at the beginning of June. Heavy winter and spring precipitation has not yet been overcome, says *The Forest Patrolman*. Considerable slash burning in Western Oregon and Washington, Northern Idaho and Montana has been done, which is of particular importance in view of conditions last fall which rendered slash disposal practically impossible.

OREGON

The Oregon State Board of Forestry has been vigorously following out a slash cleanup campaign. Records show that 15 per cent of the fires in Oregon outside National Forests the past 10 years have resulted from slashings. Elimination of slashings therefore means reduction in loss of timber. Fourteen District Wardens went on duty April 1 and 8, others during May. The best kind of cooperation from ranchers and loggers has been secured without resorting to the compulsion which the law permits.

Work of the State and Associations in perfecting plans for the present season is progressing satisfactorily. State fire warden appointments have been issued by State Forester Elliott to 36 paid men in addition to 24 paid wholly or in part by the State while 13 voluntary wardens and 123 Forest Service employes have also been appointed, making a total of 196 now holding state appointments.

WASHINGTON

The fire season of 1921 was opened in Washington April 1st by mailing 1600 notices to dispose of dangerous fire hazards and as many "No Smoking" regulations. Ten district fire wardens were put on duty to serve additional notices and to assist in slash burning. Ten more district fire wardens went on duty about May 1st. Seventy-five patrolmen and rangers will start work the first week of June, and an equal number June 15th.

The plan of the State Forest Fire Service includes an increase in patrol of about fifty wardens and rangers, and a probable increase of twenty-five or thirty in logging camp fire wardens. It also includes the construction of about one hundred and twenty-five miles of telephone line mostly in the Olympic Storm Zone, and the establishment of three new lookouts.

Unfavorable weather at the close of the 1920 season prevented fall burning, and weather conditions this spring have not been as favorable for burning slashings.

The Olympic storm zone presents a problem which calls for a large outlay for fire protection, and may require a much larger outlay for fire control. At the same

time the organization is larger and better equipped to handle fire than it has been for any previous season.

The policy of the state forest fire service in the administration of the law prohibiting kindling fires in the forests or dangerously near forest material is set forth in a bulletin issued by F. E. Pape, State Supervisor of Forestry.

IDAHO.

In common with other states slash disposal and improvement work has occupied a large amount of the attention of the various associations.

The latter part of May weather was favorable for burning slashings.

Notice was served this year on all operators by publication in the newspapers in each county that brush must be disposed of before the fire season begins, and it is proposed to follow this up with specific notice to each individual in regard to his particular area of brush, and then when his brush is cleaned up, to give him a clearance card releasing him from any further burning on the area. It is believed that when this custom has been in effect for some time better success will result in getting brush disposal than in the past.

Forest Protection Week was a great success in Northern Idaho.

NORTHWESTERN MONTANA

The Northern Montana Forestry Association, A. E. Boorman, Secretary and Chief Fire Warden, has about completed the necessary arrangements for the prevention and handling of forest fires during the season of 1921. As in previous years the work will be carried on under a cooperative agreement with the Federal Government. This agreement provides for the number and location of patrolmen, and specifies the basis on which the cost of fires occurring within the Association boundaries are to be pro-rated. The territory affected is approximately 2,500,000 acres.

The federal government, State and associations will place in the field approximately 75 patrolmen between June 15 and July 1, depending on climatic conditions. These men will be familiar with the territory they are to patrol, and each will be equipped with the necessary tools and other equipment to detect and handle fires in their respective districts.

FOREST SERVICE (DISTRICT 6) (Oregon and Washington)

A statement given out by the U. S. Forest Service indicates that its plans for fire prevention and suppression are more complete and intensive than ever before. The number of rangers and short-term men now on duty in Oregon and Washington

is about one hundred and fifty. This force will be increased to over eight hundred July 1, besides a number of trail and road crews which will be instantly available. A period of training for a considerable number of the new men has been provided and conferences have been held on a number of Forests to exchange ideas and to acquaint the men with their responsibility and the most approved methods of prevention and suppression. Two points emphasized throughout are instant action and immediate attack on all fires and prosecution of all violators of the fire laws.

Extension of trails and telephone lines has progressed—trail mileage now being between nine and ten thousand miles and telephone mileage being about six thousand.

The Forest Service is cooperating with state authorities in the brush clean-up campaign and good results are being obtained.

An area of extreme fire hazard was created on the Olympic Peninsula by the terrific wind storm of January 29. To meet it Congress and the State of Washington each appropriated \$100,000. Road, trail and telephone crews are rushing work to the end that communication be as perfect as possible. A much-used section of the Olympic Highway traverses a portion of the windthrown area. The Governor of Washington has detailed a squad of national guardsmen to register all persons entering the storm zone by way of Fairholm at the west end of Lake Crescent. An additional preventive measure is an order by the State forbidding smoking on the area except within doors and on designated camp grounds, of which there are three.

FOREST SERVICE (DISTRICT 5) (California)

The California District of the U. S. Forest Service enters the fire season more intensively prepared than at any time in the past five years. A slight increase in the man-power will materially help to handle serious situations which have developed within the lightning zones. By the middle of August at the height of the season about 525 men will be on the job, wholly or in part in fire protection work.

It is expected that at least 800 timber land owners will cooperate with the Forest Service this year in the protection of their holdings, amounting to between three and four million acres of land. In addition to this Southern California, through State, County, and agricultural and water associations, will contribute \$80,000.00 for the protection of the watershed forests surrounding rich agricultural lands.

The Air Patrol is expected to start before the fire season commences. A change in the hunting season has been secured, delaying it 15 days so that when the peak load is reached for other fires the district will be free from this source of danger.

FOREST SERVICE, (DISTRICT 1)
(Montana, North Idaho, Western Wyoming)

About 100 temporary men are now employed on maintenance and construction work, and are available for direct protection, if needed. In addition, about fifty men, employed in North Idaho on co-operative brush disposal work, are also available as organized crews for protection.

A large amount of slash was burned during the past two months, but burning has generally been discontinued because of dry conditions.

An abundance of snow in the higher country indicates late opening of the fire season there. Northern Montana is now pretty dry at lower altitudes and fires may be expected there at any time unless rain falls soon. Three small fires have occurred in Eastern Montana, but recent rains have relieved the situation in that region.

AN AIRPLANE FIRE PATROL.

An agreement has been signed by the Forest Service of the United States Department of Agriculture and the Red River Lumber Company, in California, by which the entire fire protection of about 800,000

acres of timberland owned by the company will be undertaken by the Government. The cost will be about \$12,000 a year. This means that every precaution known to the Forest Service, both for preventing and fighting forest fire, will be used. Airplanes will patrol the timberlands and every forest ranger will be a fire warden.

The timberland included in the 800,000 acres is in what is called the Lassen National Forest, in Lassen County, California, near Susanville.

CREDIT TO FOREST-FIRE FIGHTERS

A PLAN to give official and honorable mention to stockmen or their employees who render independent service in preventing or fighting fires on National Forests has been suggested by foresters of the United States Department of Agriculture. This plan should be similar to that now in effect in some sections where sheep herders who have been especially diligent in observing the grazing regulations are given a card commending them to other sheep raisers to whom they may apply for employment. The suggestion is made that special letters of appreciation could be sent by District Foresters of the Forest Service.

Ordinary cooperation which stockmen agree to in their applications should not be thus recognized, the specialists say, but noteworthy cases should receive official and honorable mention. Examples

of such cases taken from the Forest Service records are:

"Two herders saved the day in the case of one fire."

"Nine permittees fought fire 48 hours without recompense."

"A herder took up the patrol of a regular ranger during the latter's illness."

"One permittee came 30 miles and fought one hundred hours and said he expected no pay for his services."

NOTICE TO CAMPERS

TO CUT down fire losses and to remove campers from the lists as the chief offenders the following rules for fire prevention in California are given:

1. **MATCHES**—Be sure your match is out. Pinch it before you throw it away.

2. **TOBACCO**—Throw pipe ashes and cigar or cigarette stumps in the dust of the road and stamp or pinch out the fire before leaving them. Don't throw pipe ashes and cigar or cigarette stumps into brush, leaves, or pine needles.

3. **MAKING CAMP**—Build a small camp fire. Build it in the open, not against a tree or log or near brush. Scrape away the trash from all around it.

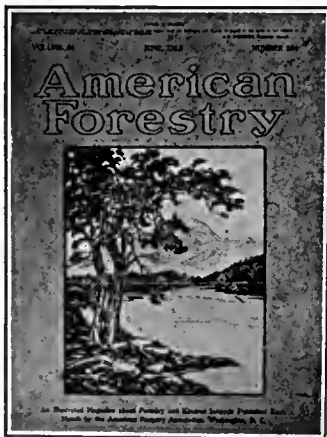
4. **LEAVING CAMP**—Never leave a campfire, even for a short time, without quenching it with water and then covering it with earth.

6. **FIGHTING FIRES**—If you find a fire, try to put it out. If you can't, get word of it to the nearest United States Forest Ranger or State Fire Warden.

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BOOK REVIEWS

Landscape Gardening, by O. C. Simonds (Macmillan). Price \$6.00.

The purpose of this book, the author says, is to help make our country more beautiful. It deals with the handling and shaping of land, plant materials, arrangement of planting, methods of planting and utilization of water in the landscape picture. Plans for home grounds, farms, public thoroughfares, railway stations, parks, forest preserves, golf grounds, schools, etc., are considered.

The author has had long experience as a practising landscape artist, and the book is the result of his mature judgment. He writes with a keen and delightful appreciation of nature.

Handbook of Yosemite National Park, Compiled and edited by Ansel F. Hall (Putnam).

Much has been written of "The Valley Incomparable" and the 1100 square miles of scenic High Sierra which have been set aside as a playground for the people and this book, compiled by an official of the National Park Service, adds substantially to the Park literature. But there still remains the task of satisfying the thousands who seek definite information concerning Yosemite—its history, ethnology, botany, geology, camp and trail-craft, natural history and related subjects. As no one man can be master of all these branches of knowledge, the editor presents this collection of articles, each by an eminent authority. Because of the consistently rapid growth of travel in our National Parks, the desire to "See America First" which seems to pervade the land, the popularity of this book is confidently predicted.

Trees of Indiana, by C. C. Deam (Indiana State).

Issued in April, 1921, by the Department of Conservation of the State of Indiana, this new and revised edition is full of interest. First published in 1911, the edition of 10,000 lasted about three years. The great demand for it justified a second edition in March 1919, which was exhausted five days after publication, leaving thousands of requests for it unfilled. These came from all classes of people, says Richard Lieber, Director of the Department of Conservation, but the greatest demand was from the school teachers of the State.

"Since forestry is an integral part of agriculture which is now taught in our public schools, and since a book on the trees of the State is in demand," he continues, "the Conservation Commission has

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—Fillbert Roth.....	\$1.50
FOREST REGULATION—Fillbert Roth.....	2.00
PRACTICAL TREE REPAIR—By Elbert Peets.....	2.35
LUMBER MANUFACTURING ACCOUNTS—By Arthur F. Jones.....	2.10
FOREST VALUATION—By H. H. Chapman.....	3.10
CHEMISTRY OF PULP AND PAPER MAKING—By Edwin Sutermeister.....	6.10
CHINESE FOREST TREES AND TIMBER SUPPLY—By Norman Shaw.....	2.50
TREES, SHRUBS, VINES AND HERBACEOUS PERENNIALS—By John Kirkegaard.....	2.50
TREES AND SHRUBS—By Charles Sprague Sargent—Vols. I and II, 4 Parts to a Volume—Per Part.....	5.00
THE TRAINING OF A FORESTER—Gifford Pinchot.....	1.35
LUMBER AND ITS USES—R. S. Kellogg.....	2.15
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DEVELOPMENT OF FOREST LAW IN AMERICA—By J. P. Kinney.....	2.60
STUDIES IN FRENCH FORESTRY—By Theodore S. Woolsey.....	6.10
FOREST PHYSIOGRAPHY—By Isaiah Bowman.....	5.10
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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.

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ATTENTION, FORESTERS

AMERICAN FORESTRY will print, free of charge in this column, advertisements of foresters wanting positions, or of persons having employment to offer foresters. This privilege is also extended to 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.

POSITIONS WANTED

TECHNICAL FORESTER with considerable experience in various phases of practical forestry and sawmill work, desires position with manufacturing concern in the East or Middle-West. Dry-kiln work, offering opportunity for development preferred. Address Box 2060, care AMERICAN FORESTRY, Washington, D. C.

YOUNG MAN, 36, single, technical trained and practical experience in forestry, tree surgery, landscaping and orchard care, wants to get in business for himself as city forester in an excellent location anywhere in the United States. Will also consider position as forester on large estate. Employed at present and best of references. Address Box 2065, care AMERICAN FORESTRY Magazine, Washington, D. C.

POSITION WANTED by young graduate forester. Six years practical field work in forestry and lumbering. Am now employed but desire change. Box 2075, care AMERICAN FORESTRY, Washington, D. C. (4-7-21)

FORESTRY GRADUATE, age 30, several years experience in forest work, including city forester, landscape development, portable logging, reforestation, knowledge and experience in farming and farm machinery. At present employed along technical and administrative lines. Will be open near future for responsible position, preferably in development and management of private forest or estate. Box 2070, care AMERICAN FORESTRY Magazine, Washington, D. C. (4-7-21)

YOUNG MAN with master's degree in forestry and who also has had experience in city forestry, tree surgery, and esthetic forest planting desires a position in any phase of forestry—logging, lumbering, forest management, or city and esthetic forestry—where marked ability will bring advancement. Would also consider a position as part time instructor in botany, the remaining time as city forester. Have taught botany while a graduate student in one of the foremost universities in America. An ex-officer of the World War. Address Box 2080, care AMERICAN FORESTRY MAGAZINE, Washington, D. C. (4-6-21)

POSITION WANTED by graduate forester, veteran 10th Engineers, at present lumber inspector Pennsylvania System, experience in French forests, Southern Pine and Northern Hardwoods. Desire position as forester for private estate or other work. North preferred. Address Box 2085, care AMERICAN FORESTRY MAGAZINE, Washington, D. C. (4-6-21)

POSITION WANTED BY FORESTER. A healthy United States citizen, 36 years old, actively engaged in logging in equatorial America, where he has done considerable practical and scientific pioneer work, now wants to return to work under more civilized and progressive conditions. Has 12 years' bush and mill experience. He works best where difficulties and problems are greatest. He is a practical enthusiast for constructive and reconstructive forestry, and desires to make connection with a body recognizing said qualities. Address Box 2090, care of American Forestry Magazine, Washington, D. C. (6-8-21).

EX-SERVICE MAN wishes employment with some Forest Construction Concern or Irrigation Company which can use a young man who is a Technical High School Graduate, and who is a Mechanical Draftsman with some slight knowledge of plane surveying. Willing to work and can do same. Address Box 2095, AMERICAN FORESTRY MAGAZINE, Washington, D. C. (6-8-21)

authorized a revised edition of the Trees of Indiana. What was formerly Bulletin No. 3 of the Division of Forestry is now published as Publication No. 13, of the Department. The reader's attention is called to a new departure in illustrations, which were made from photographic reproductions of specimens in Mr. Deam's herbarium. The photographs were taken by Mr. Harry F. Dietz of the Division of Entomology. It is believed that it will be gratefully received by the public and will stimulate an interest in forestry that should achieve practical results."

A most interesting and valuable address on the Utilization of Hardwood Waste was delivered by Mr. L. Wallis Gibbons to the Appalachian Logging Congress when in session in Cincinnati. Mr. Wallis drives home in a very convincing manner practical facts about practical values in the elimination of waste as an economic factor, touching on the work of the Forest Products Laboratory and referring to the annual fuel increment, fuel gas produced from wood, the enormous amounts involved in lumber wastes, the products of hardwood distillation, varieties, and the uses and possibilities of tar and wood waste to preserve wood.

OHIO FORESTRY LAWS

The three Silver bills, fathered by Representative Silver, of Preble county, to carry out the program of reforestation and preservation of the present forests in the Buckeye State, were signed by Gov. Harry L. Davis and will become effective about August 15, thus allowing 90 days in which to file referendum petitions. The three bills, often styled the Silver triplets, provide for an appropriation of \$50,000 for the purchase of waste land, \$10,000 for fire protection, and \$10,000 for a State nursery. This is the program of the Ohio Forestry Association. A State forester is to be named and it is believed that the present incumbent at Wooster Experiment Station, Edmund Secrest, will be appointed.

A CORRECTION

On page 272 of the April issue of AMERICAN FORESTRY, an error in the heading of an item has been corrected by C. R. Pettis, Superintendent of State Forests of New York. Trees from New York State Nurseries which reading of an announcement implied were available

POSITIONS OPEN

Nursery in Central West

Is looking for a capable, experienced young man, especially fitted for the growing of forest tree and evergreen seedlings for commercial purposes. Must be a man of initiative and one who can plan his work. Give references, facts and experience and state salary desired.

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WASHINGTON, D. C.

ble for free distribution to the citizens of New York, are not free, advises Mr. Pettis.

PULPWOOD FROM ALASKA

The time seems to be ripe for the extensive exploitation of Alaskan pulpwood, in the opinion of the Forest Service, United States Department of Agriculture. In Department Bulletin 950, entitled Regional Development of Pulpwood Resources of the Tongass National Forest, the successful operation of pulp and paper mills in near-by British Columbia, which has practically similar timber and power resources and comparable transportation facilities, is pointed to as removing the speculative element from the proposed development.

The demand for paper, it is said, has increased to such an extent that it has become possible for well-organized and adequately financed companies to operate pulp and paper mills on an extensive scale, particularly for making newsprint. All indications point to a continuance of the demand at prices that should make possible profitable operations in Alaska. New sources are imperatively required, it is said, for the supply of raw pulpwood.

The Department of Agriculture believes that the development of the forest and water-power resources of Alaska is a practicable means of increasing the supplies of newsprint available for the United States and of eventually lessening the paper shortage now so acute. The National Forests of Alaska probably contain, it is estimated, 100,000,000 cords of timber suitable for the manufacture of newsprint and other grades of paper. Under careful management these forests can produce 2,000,000 cords of pulpwood annually for all time, or enough to manufacture one third of the pulp products now consumed in the United States.

BUYING PULPWOOD BY WEIGHT

WORK done at the Forest Products Laboratory, in co-operation with the Newsprint Service Bureau, to obtain data on buying and using pulpwood on the weight basis indicates that such procedure would be very desirable. If such a thing proves possible the uncertainty as to the actual solid cubical content of the present cord would be eliminated and allowing for the percentage rot in wood by scaling would partly be done away with. Buying pulpwood on the weight basis has the further desirable features that the industry could establish a sensible and rational cost accounting system and it will also be a decided stimulus to a more thorough technical control of all of the mill operations. The disadvantages, however, are that the seller of wood will have to be educated to this method of purchase, and at the present time since there is an actual shortage of pulpwood the mills will have to purchase according to the method desired.



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STATE NEWS

CALIFORNIA

PAUL G. REDINGTON, District Forester, says: Because of the large number of forest fires, traceable directly to the carelessness of tourists, campers, hunters and fishermen, which have occurred within the National Forests during the last few years, written permits will be required before camp fires may be built in California. Last year over one and one-half million people visited the National Forests in California, and the travel into the Forests has become so great that every possible precaution must be taken to prevent forest fires from starting. All campers and tourists are urged to get a written permit before building any fires and should be very careful to see that all fires are thoroughly out before they are left.

Camp fire permits will be required in the Angeles, Cleveland, Eldorado, Klamath, Lassen, Plumas, Santa Barbara, Shasta, Tahoe and Trinity National Forests. They are issued free of charge by all Forest Officers in the field and by numerous merchants and fire agents on and near the National Forests.

Assembly Bill No. 769 provides that each teacher in any public school of the State of California shall devote a reasonable time in each month during which such school is in session to the instruction of the pupils in a course of study and fire prevention comprising ways and means of preventing loss and damage to lives and property through preventable fires:

District Forester Redington says: "We believe that this is a very valuable preventative measure and should greatly help reduce man-caused fires in the woods, as well as in the homes."

Last year in California fires destroyed timber, grass and grain worth \$983,562 and burned over approximately 415,275 acres. This bill will go far to provide a remedy for the needless destruction of timber and other resources. Another and very simple remedy may be summed up in the phrase "Help Protect The Forests—Be Careful With Fire." This done, seventy-five per cent of our forestry problems will be solved.

NEW YORK.

THE sale of trees to private individuals from the New York State Nurseries during the spring planting season of 1921 shows a decided increase in the demand for trees for reforestation purposes over the last four years. The sales for the spring planting alone this year almost equal the total distribution for last year.

The advantages to be derived from the reforestation of cut-over woodlots and land not well suited to agricultural purposes are appealing to more and more farmers every year, and since 1908 when the State began supplying trees to individuals at cost, more than thirty million trees or, allowing 1000 trees to the acre,—thirty thousand acres—have been set out in private plantations.

The records of the State Conservation Commission show that from 1901 to 1920 inclusive, 60,372,684 trees were planted in New York State and that this number was about equally divided between private individuals and the State, private plantations totalling 29,033,805, and State plantations 31,408,879.

The largest shipments were Scotch pine, 1,320,325 trees, and Norway spruce, 1,135,600. Other varieties were: white pine, red pine, white spruce, white cedar, European larch, black locust, white ash and Carolina poplar.

NORTH CAROLINA

THE Geological and Economic Survey of North Carolina, following the President's proclamation of Forest Protection Week, prepared a bulletin addressed to the boys and girls of the State urging their cooperation and support. Written in a manner sure to interest them, the bulletin contains pertinent facts and valuable information relative to our forests and their protection and perpetuation.

The Survey distributed twenty-five thousand copies of this bulletin, to which was appended a copy of the President's Forest Protection Week proclamation, to the schools, boy scout and similar organizations throughout the State, as well as to the press. Such splendid publicity work in North Carolina will undoubtedly serve to create and stimulate the public interest in forest conservation.

PENNSYLVANIA

THE State Forest Commission has taken action to establish about fifteen State Parks, or recreation grounds in different sections of Pennsylvania. Governor Sproul recently approved a law authorizing the Commission to set aside within the State Forests unusual or historical groves of trees especially worthy of permanent preservation. The law provides that the Parks are to be made accessible and convenient for public use, and they are to be dedicated in perpetuity to the people of the State for their recreation and enjoyment.

Colonel Henry W. Shoemaker, a member of the Forest Commission, has suggested a list of fifteen historical and noteworthy

groves of big trees which he considers suitable for Parks in various parts of the State. The Forest Commission has agreed that an advisory committee shall be appointed to act on the selection of the proposed recreational areas, and other sites which may be considered later.

FREE education in forestry is offered the young men of Pennsylvania by the State Department of Forestry. Gifford Pinchot, the Chief Forester, announces that competitive examinations are to be held at Harrisburg for free scholarships to the State Forest Academy, at Mont Alto.

The ten highest men will be appointed to the Forest Academy where they will begin their study of forestry next September. A further test of six week's work will be given on one of the State Forests.

Young men between the ages of 18 and 25, who have completed a four years' high school course and who have had experience in farming, lumbering, surveying and other forms of outdoor work, are particularly desired. The scholarships provide free tuition, board, room and laundry. Upon successful completion of the course, which includes thorough and practical training, a degree in forestry will be awarded.

WEST VIRGINIA.

On May 10, 1921, the Lookout Station on Lick Knob, was completed and it is now in operation. This work has been accomplished largely through the active and earnest cooperation of public spirited citizens of the State with the forest officers, in their efforts to further forest protection. E. N. Wriston is in charge of the Lookout Station under the direction of C. W. Harding, Forest Fire Warden.

ANOTHER ENDORSEMENT FOR THE SNELL BILL

MISS HENRIETTE ORD JONES, chairman of Tree Planting of the New York Bird and Tree Club, reports the passage by the Club of a resolution strongly endorsing the Snell Bill, H. R. 15327, and urging its favorable consideration by Congress because of its vital economic importance in insuring continuous forest production.

POWER COMPANY REPLANTS

THE Northern New York Utilities, Inc., through its president, Mr. John M. Carlisle, reports keen interest in the campaign of the American Forestry Association for reforestation and advises that the Company is now engaged in the reforestation of the lands around its power plants. They have already set out 600,000 trees and intend to plant about 200,000 each year in the future until approximately 2,000,000 trees have been planted. Mr. Carlisle is also interesting local county and club officials in this program. Work of this sort cannot be too highly commended.

SOUTHERN FORESTRY CONGRESS TO MEET IN ATLANTA

THE third meeting of the Southern Forestry Congress will be held at the Piedmont Hotel, Atlanta, Georgia, Wednesday and Friday, July 20-22. It is planned to make this the largest and most important forestry meeting ever held in the South.

One day of the Atlanta meeting will be devoted to a consideration of a forestry policy for the Southern Appalachian, South Atlantic, and Gulf States. In connection with this it is proposed to hold a conference of Southern Governors. President Harding, Secretary of Agriculture Wallace, and several United States Senators are being invited to be present and contribute their ideas on this most important subject.

The protection of forests from fire, classification and taxation of lands, reforestation of cut over lands, National and State forests are other topics which will receive consideration. Experts on all these subjects are being invited to speak and all delegates will be free to join in discussions.

The officers of the Congress are: President, Henry E. Hardtner, Urania, Louisiana; Chairman Executive Committee, Colonel Joseph Hyde Pratt, Chapel Hill, North Carolina; Secretary J. S. Holmes, Chapel Hill, North Carolina; Assistant Secretary, R. D. Forbes, Superintendent of Forestry, New Orleans, Louisiana; Chairman Committee for State of Georgia, B. H. Stone, Blairsville, Georgia. Further information can be secured by writing the Secretary.

100,000 ACRE JERSEY FOREST PUT TO WORK

DEVELOPMENT of the forest resources of the Wharton Estate, consisting of 100,000 acres of woodland in Burlington, Atlantic, and Camden Counties, New Jersey, has begun by the appointment of James O. Hazard as Forester of the Wharton properties in South Jersey. Mr. Hazard, who is a graduate of the Yale Forest School, and who was formerly in the service of the State as Assistant Forester, has recently established a residence in Hammonton. He has begun at once the work of protecting the woodlands from fire and developing the forest resources, so that this tract, now consisting largely of young and frequently burned forest, may be returned to productivity. Due to the repeated fires there are, today, only five sawmills cutting timber from this tract. These mills have an average cut per day of about 3,000 to 4,000 board feet. Had fire been kept out of the forest for the past fifty years and the cut regulated to the amount of the annual growth, the tract would now be capable of supporting continuously, 16 sawmills cutting an average of 10,000 board feet per day or 3,000-

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Make your Association financially better able to fight for legislation to perpetuate our forests, to carry on our work of public agitation and to further our endeavors to provide forest products for our future needs by suggesting for membership some public spirited people you believe interested in forests, in trees and kindred subjects.

American Forestry Association,
Washington, D. C.

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000 board feet per year, each. This affords a striking example of a valuable industry lost to the present through the forest fire menace. The practice of forestry will in time return this valuable industry to the locality.

ARMY AIRPLANES CRUISE OLYMPIC BLOW DOWN

AIRPLANES, with Army officers as pilots and men from the Forest Service, United States Department of Agriculture, as observers, recently completed an air "cruise" of the Olympic Peninsula forests in the State of Washington devastated by the tremendous tornado of January 29. From data and photographs collected during these flights, forestry experts estimate that 6¾ billion board feet of timber was blown down by the storm, and to-day forms one of the greatest fire traps in the history of the country.

The storm-swept area extends along the west side of the Olympic Peninsula from Clallam Bay on the north, southward for some 90 miles to Grays Harbor, and inland from the coast a distance of from 20 to 30 miles. The storm was the most severe that has visited the Pacific coast, so far as evidence is available, an estimated velocity of 150 miles per hour being reported.

The amount of wind-thrown timber on State, Indian reservation, and private

* AMERICAN FORESTRY is not included in this discount offer.

lands is estimated at approximately 6 billion feet, and on National Forest land at 750 million feet. District Forester George H. Cecil, of Portland, Oregon, who was an interested spectator from the "hurricane deck" of one of the planes, reports that the wind-thrown areas are very spotty—in some places practically all the trees being down, while in others but little damage resulted from the wind. Only a small amount of the down timber, it is said, can be salvaged, because of the lack of transportation facilities.

Should fire gain headway in this devastated region, forestry experts say that the most stupendous conflagration ever known in America would result. Special appropriations have been passed by the Federal and State Governments to meet this emergency, and strict measures will be taken to prevent fires starting from human agencies.

FORESTRY CLUB ORGANIZED

The Penobscot Forestry club was organized at the Bangor Chamber of Commerce, 25 foresters of Bangor and vicinity being present and participating in the organization. D. A. Crocker of the Eastern Manufacturing Company, was elected president, R. E. Pineo of Milo, timberland dealer, was elected first vice president, H. B. Morse of the Orono Pulp & Paper Company, second vice president, Shirley Rogers of the Great Northern Paper Company,

third vice president; and P. T. Coolidge, of Bangor, forestry engineer, secretary and treasurer.

The object of the club shall be the promotion of social intercourse and the study of forestry and its allied activities.

The committee which is responsible for the organization plans consisted of Prof. J. M. Briscoe, George T. Carlisle, Jr., K. McR. Clark, P. T. Coolidge, D. A. Crocker and H. B. Morse.

NEW YORK LUMBER CUT DOUBLED IN VALUE.

New York cut 411,000,000 feet of lumber in 1920, valued at \$20,000,000, or nearly double the value of the 1918 cut. This remarkable increase was due primarily to the great post-war increase in lumber prices, which reached its peak in March, 1920, together with the fact that the quantity of lumber sawed increased 25 per cent in two years. The number of mills cutting 50,000 feet or more increased from 1,023 to 1,206 in the same period. The average valuation f. o. b. mill of the lumber cut was \$48 per M feet—the highest point on record.

These figures are based upon a preliminary statement of the Forest Service United States Department of Agriculture, cooperating with the Bureau of the Census, United States Department of Commerce, and with the State of New York, in the census of lumber production in 1920.

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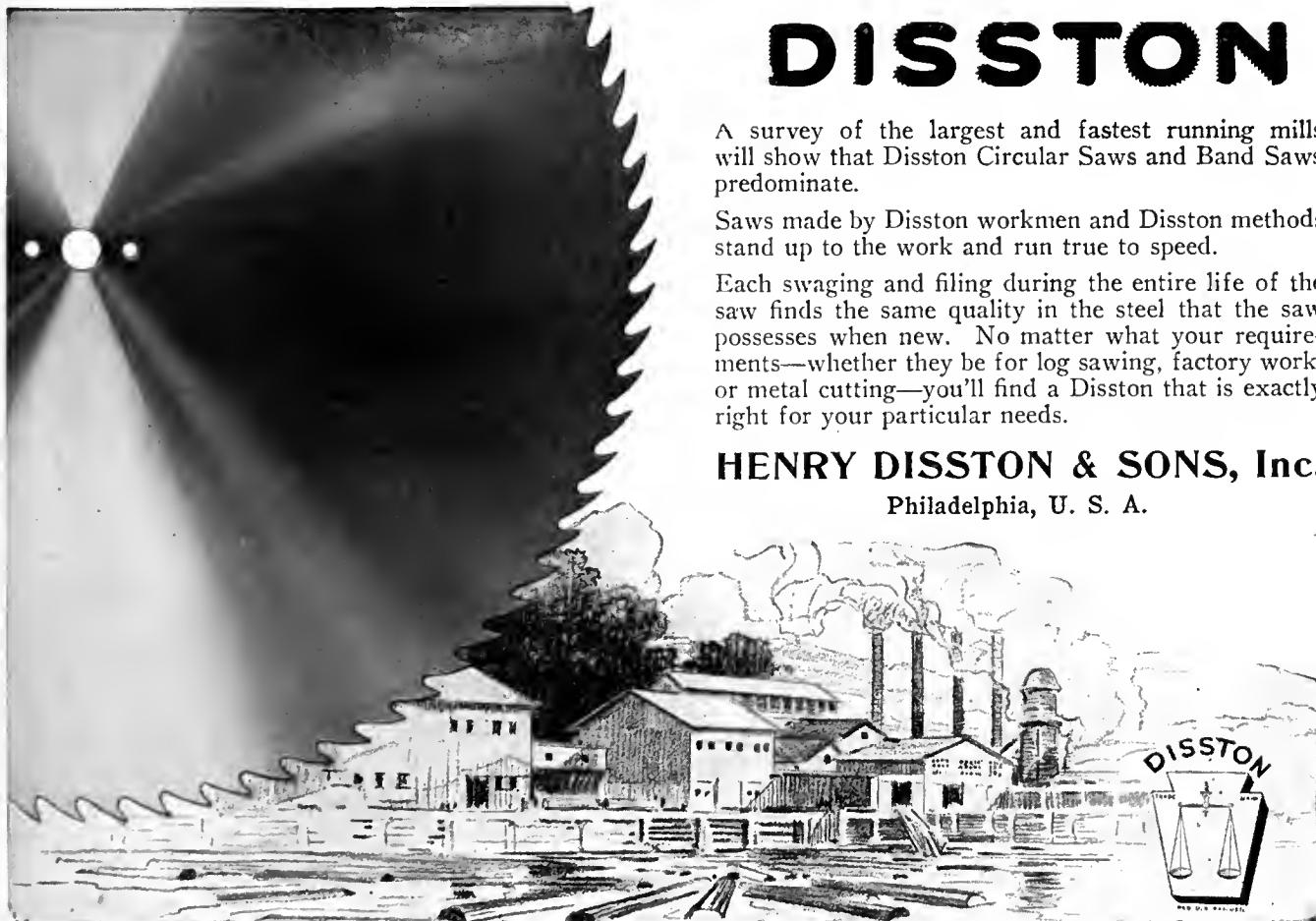
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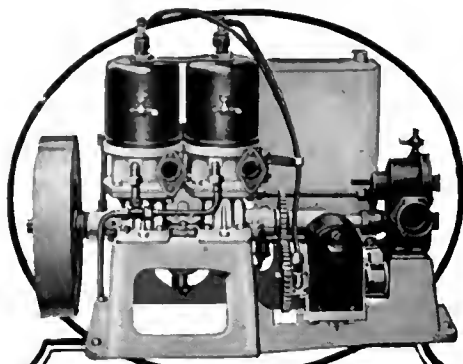
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FOREST PROTECTION WEEK WIDELY OBSERVED

NATION-WIDE observance was given Forest Protection Week, which began Sunday, May 22. The governors of 14 States issued proclamations impressing the people with the importance of using every possible precaution to prevent fire throughout the year, not only in forests, but in every other place endangering the safety of human life and property. These 14 States are Arizona, California, Colorado, Idaho, Illinois, Maine, Massachusetts, Mississippi, New Mexico, South Dakota, Utah, Virginia, Washington, Wisconsin.

In addition to this help the governors of seven States; Minnesota, New York, North Dakota, Oregon, Pennsylvania, Texas, and Montana, prepared special statements urging the general observation of Forest Protection Week, while eight governors declared themselves favorable to the best possible form of forest protection, although issuing no formal proclamation. These were Arkansas, Connecticut, Kentucky, Louisiana, Missouri, New Hampshire, Rhode Island, and South Carolina. Other governors, known to be friendly to the protection and conservation of forests, doubtless have issued proclamations or statements which have not been received in Washington.

Probably no previous effort inaugurated by the Forest Service has received such prompt and cheerful support from every department of business. The Chamber of Commerce of the United States; the International Kiwanis Clubs; the American Automobile Association; National Board of Fire Underwriters; International Association of Rotary Clubs; National Fire Protection Association; the General Federation of Women's Clubs in virtually every State in the Union; the Daughters of the American Revolution, all have sent out letters, or specially prepared circulars, drawing attention to the special purpose of the week. State Foresters in many States have started one form or another of publicity to induce talk and create continued interest in the one big subject of the week.

The Boy Scouts of America, considered by the Forest Service to be one of its most efficient allies in preventing forest fires, issued a special forest protection number of the monthly publication, "Scouting," for May, and Forester W. B. Greeley, and Chief Scout Executive James E. West of New York, sent 10,500 letters to scoutmasters and scout executives every where in America. The Post Office Department ran 22 fire prevention cancellation dies in many of the principal post-offices throughout the Nation so that every letter sent from those offices carried the message.

In Washington, D. C., the D. A. R. observed the occasion by planting trees. The

American Forestry Association held a special Forest Protection Week demonstration in Rock Creek Park. The National Board of Fire Underwriters sent out 160,000 copies of its official publication, Safeguarding America Against Fire, to every city and town. In this issue it is shown that in the last five years the forest fires in 45 States have cost the country \$85,715,747 for timber burned on nearly 56½ million acres. At least 80 per cent of these fires were caused by human agencies and were, therefore, preventable.

The Red Plague, a special statement issued last week by the Forest Service, says: "Three-fifths of the original timber supply in the United States is gone. There is now consumed annually more than 51 billion board feet of material of saw-timber size, and nearly 5 billion feet is destroyed by fire, insects or other agencies. Our depleted forests are growing less than one-quarter of this total amount. Not only are remaining virgin forests being cut heavily, but we are using up the second growth and small material on which depends our future supply. In all, the requirements of our population are close to 300 board feet per capita. The answer to the forestry problem is not to use less wood, but to grow more—to put our idle acres to work producing trees. The crux of the problem lies in preventing forest fires."

NEW YORK'S LIBERTY POLE RE- STORED

NEW YORK is to get back its Liberty Pole. Flag Day, Tuesday June 14, in City Hall Park, a great flagstaff was erected on the exact site of the old Liberty Pole which stood there in 1766 and was cut down by the British when they occupied the city after the American army evacuated New York.

In the procession appeared delegations from the New York Historical Society, Sons of the Revolution, Society of the Cincinnati, Society of Tammany, the American Legion and representatives of twenty-seven other historical and patriotic societies in the city.

It was a colorful procession. Tammany's sachems appeared in Indian costume, as they did upon their first appearance. Flags of all our wars were carried. Senator Willis of Ohio was the orator of the day, and President Olyphant presented the pole to Mayor Hylan, while the children from the public schools and the City History Club sang and Bishop Manning pronounced the benediction.

When the original Liberty Pole was erected it should be understood that the City Hall was then at the corner of Wall and Nassau streets. What is now called City Hall Park was a large space of practically unoccupied land belonging to the city and known as the Common.

There were five Liberty Poles in all, but

each was erected within a short distance of the others and all on the Common. The first was erected on the evening of June 4, 1766, on the twenty-eighth birthday of King George III, and it proved to be the curtain raiser for a series of dramatic events which finally culminated in the War for Independence.

Upon the passage of the stamp act the colonies were aflame with indignation. When news reached London of the really serious situation created in America, the unfortunate act was repealed, and it was to celebrate this repeal that the first Liberty Pole was erected.

A great day of public rejoicing therefore was planned for the King's birthday. Upon that occasion a huge barbecue was arranged. Two whole oxen were roasted in the park. Beer, bread and other articles of food and drink were served in unlimited quantities. Cannon boomed from warships in the harbor and from the fort. The day passed in exuberant exhibition of good feeling on the part of the people toward the crown. In the evening the royal Governor and prominent citizens held a banquet at Burn's coffee house, at which the greatest cordiality prevailed. Forty-one toasts were drunk. Everything possible was done to make the occasion a day long to be remembered in the annals of New York, and, to make assurance doubly sure, the citizens erected a huge pole in the park at the close of the day's festivities and ran up a flag on which was inscribed "The King, Pitt and Liberty."

This was the first Liberty Pole and the public appearance of the Sons of Liberty. The present pole is as nearly as possible an exact duplicate of the original and stands in precisely the same spot. In one important particular, however, there is a difference. The original mast was of pine from the State of Maine. In the new pole, to typify the unity of the nation from coast to coast, the mainmast is a stick of Douglas fir, the gift of the West Coast Lumbermen's Association, while the topmast comes from the East Coast, the original State of Maine, the gift of Frank C. Deering, of Saco, Maine.

SAVES THE REDWOODS

Gov. W. D. Stephens, of California, has signed the redwood preservation bill, which was passed by the State legislature. The Save the Redwoods League, which has four thousand members, including citizens of California and a number of prominent persons in other parts of the United States had been working for several years toward this end. The law provides funds for saving many of the redwood trees along the State highway in Humboldt County. It will not interfere much with lumber operations, but will preserve fine specimens of this species for future generations.

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It is a fitting tribute to the memory of Abraham Lincoln that the Lincoln Memorial grounds, at Washington, D. C., will be planted with trees in memory of individual soldiers, sailors or marines who lost their lives in the World War. This beautiful memorial, surrounded by living trees that will perpetuate the heroic deeds of the men of a generation half a century later than Lincoln interests every American.

Several hundred trees will be planted along the driveways and on the grounds leading to the Memorial Building. The grading will be completed enough by early fall to provide sites for the first of these trees. Trees will then be planted as the grading progresses. Each individual tree will be furnished and planted by the family of an individual soldier, sailor or marine who was killed in action or died from wounds received in action. Each tree will be labeled with a brass tag, and the name and service unit of the soldier, sailor or marine for whom it is planted will be recorded in the office of the custodian of the Lincoln Memorial Building. The contract for planting these trees has been let to the landscape firm of Lewis and Valentine, who will make uniform selections. The individual wishing to plant a tree in these grounds will make application to Custodian, Lincoln Memorial Building, Washington, D. C. In turn, a certificate is returned to applicant. This certificate will then be sent to Messrs. Lewis and Valentine, who will select the tree to be planted.

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FOREST GUIDE DEPT.

(Continued From Page 457)

ouilt, also how to use the tools.

In cutting down the trees they were taught to handle an ax properly. In building the fence, they were not only taught the use of tools, but also to create something worth while out of forest waste, besides greatly beautifying the camp site, by the removal of unsightly trees, and all the time while improving the camp they were passing their tests.

A class was taught how to draw maps.

Do you know how to mount weeds, leaves, flowers, grasses and insects? Take stiff cardboard for the back, cut to size you need. Next, place a layer of cotton of same size over the cardboard, then place your specimen on the cotton. Next, place a sheet of celluloid, such as is used in auto tops, and which can be purchased where auto tops are made, over all and bind edges together with passe partout binder.

This will make either a valuable troop exhibit or one for your own collection.

* * * *

I CAN see you now, sitting around your evening camp-fire, telling the others what new something you found during the day, and what treasure hunt you would go on tomorrow, and just as you begin to feel drowsy and talk slows up, some small boy, who had stretched out on the flat of his back, all of a sudden, as the campfire flares up, points up and asks you in a hushed voice, "What's that?" You gaze in the direction the finger points, and there you see, circling this way and that, a beautiful Luna moth. As you gaze and wish that you might have it for your own collection, the bugler, in low, mellow tones, begins to sound taps, and while rising to retire to your tent, I can hear you softly singing to the tune the bugler is playing:

*"Day is done, gone the sun
From the lakes, from the hills, from the sky.
All is well, safely rest,
God is nigh."*

As you lie on your cot or bed of Balsam boughs, you wonder what tomorrow will have in store for you, and it occurs to you that you were going to collect specimens of wood and leaves of different trees, to build an exhibit for your troop meeting room, like the one you read about in the May number of *The American Forestry Magazine*, that you had not started, and turning over on your elbow, you tell Bill or John that you will have to get busy on the wood collection, and it may surprise you to learn that Bill already has ten specimens, all carefully packed and labeled.

In the August number I will tell you how trees travel and what story a walnut tree told me. There will also be an article on moths and how to mount them.

PLEASANT THINGS TAKEN FROM LETTERS TO THE EDITOR

"I have read the article by Dr. Shufeldt on antelope in the December issue of AMERICAN FORESTRY and like it almost the best of anything of his I have ever read."

DAN B. STARKEY.

"I wish to thank most heartily the sender, whoever he may be, for the most interesting and best illustrated number of the AMERICAN FORESTRY Magazine, which I have ever seen (November, 1920)."

H. T. ELES.

"I have read the articles by Dr. Shufeldt on fish and foxes with much interest and instruction to myself, as well as the other articles in AMERICAN FORESTRY, especially the one on bees."

DR. H. J. BOLDT.

"I have read the article by Doctor Shufeldt on Nature Photography with much interest and I am now sending the magazine to Miss Caroline Stackpole, who is in charge of our animal nature study."

M. A. BIGELOW.

"I wish to express my appreciation of your wonderful magazine."

MRS. W. M. CLUTE.

"I certainly agree with you that this is one of the most important years in forestry that this country has ever had. Apart from my interest in forestry, I want to add a word regarding my appreciation of the journal of our Association. I have but one magazine that I take more interest in reading, and it is a toss up between the two. I cannot afford to miss a single issue."

CLEMENT W. BAKER.

"Congratulations on your work. I am greatly interested."

J. THOMPSON HENRY.

"A copy of the April number of AMERICAN FORESTRY came to my desk today and I got a great deal of pleasure in going through it. The graphic features and the editorial pages balance up excellently. You are to be congratulated on getting out such an excellent publication."

JOYCE O'HARA.

"The April issue is a peach!"

ARTHUR H. CARHART.

"My sincerest wishes for the extension of the grandly useful AMERICAN FORESTRY."

JAMES RICALTON.

AMERICAN FORESTRY

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CHANGE OF ADDRESS

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Clipping from the New York Tribune, June 9th, 1921

Read this Clipping—

IN many sections of the country white ants (termites) are causing rapid deterioration of structural timber, and this menace is spreading rapidly.

Investigations of these insects made by the U. S. Department of Agriculture are reported in Farmers' Bulletins Nos. 759 and 1037, and among the preventive measures advocated is the following:

"Where stone or concrete foundations are impracticable, timber impregnated with coal-tar creosote should be used. Untreated beams should never be laid on the earth nor imbedded in moist concrete, since they will rot, even if they do not become infested.

"Any wood construction in con-

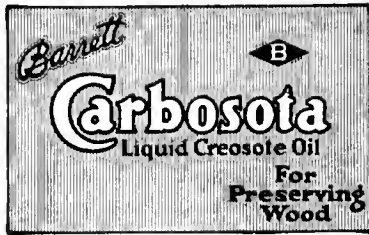
tact with the ground is especially liable to attack by white ants. Among these may be listed construction timber in bridges, wharves, and similar structures, telephone and telegraph poles, mine props, railroad ties, posts, lumber piled on the ground, wooden boxing for cables, cy-press water tanks, etc."

Carbosota Protects Wood from White Ants as Well as Decay

TO check the loss occasioned by the white ant pest, preservative treatment should be applied to all lumber and timber used in contact with other wood, or with the ground, masonry, or brick and concrete foundations. The treatment must be thorough, and the method employed must, of necessity, be practicable under conditions common to general construction.

In effectively combating ants and other wood-destroying insects, as well as in checking the ravages of wood decay, Carbosota—particularly when applied by the Open Tank process—is proving a great boon to lumber users all over the country.

Carbosota Liquid Creosote Oil is the ideal wood preservative for non-pressure treatments, i. e., Surface treatments (brushing, spraying and dipping) and the Open Tank process (hot and cold, or hot and cooling bath). It is a standardized, highly refined, liquid



grade of pure coal-tar creosote oil, specially processed and uniform the world over.

Write for free booklet.

(Green wood cannot be effectively creosoted by non-pressure processes. It should be seasoned. All framing, drilling of bolt holes, etc., should be done before treatment. If this is impossible, two brush coats of Carbosota should be applied to all untreated surfaces exposed by subsequent cutting or drilling.)

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Oak floor honeycombed by white ants (termites). [Reproduced from Farmers' Bulletin 1037, U. S. Department of Agriculture]



Serious deterioration of telegraph pole near ground line due to white ants (termites).



Untreated sills and posts in contact with brick foundation piers entirely destroyed by white ants (termites).

AMERICAN FORESTRY

VOL. 27

AUGUST, 1921

NO. 332

EDITORIAL

PROPOSED TARIFF ON LUMBER

DECLARING that he is opposed to any tariff on lumber Charles Lathrop Pack, President of the American Forestry Association, in a statement to President Harding has pointed out the several reasons why he believes that Congress should not impose such a tariff.

Mr. Pack believes that with the country in vital need of at least a million homes and quite as many, if not more, farm buildings, any tariff which would add to the cost of construction would result in serious delay in solving the housing problem and the equally important need of buildings for agricultural purposes. He believes that now is the time to build because it is certain that prices of lumber will increase as the years go by to such an extent that unless adequate housing is now provided it will be seriously retarded by growing costs.

He also believes that any tariff which will add to the cost of paper is inadvisable because it will material-

ly affect the production of newspapers, magazines, and books, the greatest educational mediums in the country.

Another reason advanced in opposition to the tariff by Mr. Pack is his belief that no restrictions should be made against the use of the natural resources of any country by the United States when such natural resources of its own are being steadily decreased by our constant use of them.

Finally he declares that our own forests are being depleted at such a rate that it will be false economy to adopt any measure which would increase the demands upon them when such demands can be supplied by importation from other countries. The time is now here, he says, when we have awakened to a realization of the serious situation brought about by our diminishing forest areas and our failure to provide means for perpetuating our forests so that they will provide for our present as well as our future needs.

WHAT DOES THE PUBLIC WANT?

THERE are now before Congress two so-called National Forestry Bills; the Snell-McCormick Bill, which has been frequently discussed in AMERICAN FORESTRY Magazine, and the bill recently introduced by Senator Capper. In the main the objects which these bills purpose to accomplish is the same—the prevention of forest devastation by fire, and the creation of an effective basis for reforestation throughout the country. The difference lies purely in the means suggested, the Capper Bill proposing to place forest control chiefly and directly in the hands of the Federal Government, while the Snell-McCormick Bill urges upon the several states their plain duty and provides machinery for Federal example and cooperation in a manner similar to the operation of the Federal good roads laws. Foresters disagree in the same way that railway economists have for years disagreed upon matters of railway ownership and control. Federal control versus State Rights and interests has formed the basis of a thousand such controversies since the first in-

ception of our democracy, and will continue to do so.

It is not for a group or society of the scope of the American Forestry Association to deprecate any method of accomplishing the desired end, nor to put forward another plan as being without flaw. Through our members in every part of the United States we are interested solely in achieving a practical and economic forest policy. That there are other ideas and plans for accomplishment of that end serves only to emphasize the fundamental issue, and a thorough discussion of the problem will best satisfy the paramount interest of the public. What the public wants is not just a Snell-McCormick Bill or a Capper Bill, but an honest forward-looking forest policy. The American Forestry Association strives to represent that public interest, and believes that it is doing so in endorsing and advocating the Snell-McCormick Bill because it is the bill endorsed and desired by the United States Forest Service, whose function it is to know what is best for the forestry interests of the country.

FORESTRY FOR CHILDREN

WOMEN of Tennessee, aroused by the agitation in behalf of forestry, both relating to the states and nationally, have accomplished what is not only an innovation in forestry legislation, but an achievement which will

make every citizen of the next and succeeding generations, a forest conservationist.

This is nothing less than an "act to require and promote the study of forestry and kindred subjects in the

public schools of the state."

As Tennessee has fine forests and a great variety of trees the women decided these should be conserved for present and future generations, and that the best way to secure this conservation was to give the children a knowledge of forest and plant life. This they believe will promote a higher appreciation of tree life, its contribution to the soil, its beauty and artistic value, all of which they declared should be a matter of enforced education and taught in the schools of the State.

The act requires that "the curriculum of every public school in the State shall include a study of forestry and plant life, which study shall include the names and varieties of trees grown in the State, their age of maturity, their value to the soil, to animals and birds." Also the children are "to be given an object lesson in the study of

forestry" by "visits to some forest and there instructed."

Every pupil must, during the school session write at least one short essay or story on forestry.

The promoters of this act indicate that correlation of the study of forestry in connection with other studies in the public schools is explained as follows: An art lesson may be taught in the drawing of trees and plants. A composition lesson may be taught in writing of trees and plants. A language and memory lesson may be taught in knowledge gained by the observation and the reading of books on trees and plants so that the child may grow up with the knowledge of the value of forestry.

In other words it seems these children are to be taught the alphabet of forestry so that when they grow up they can talk the language of forestry.

INDIANA'S NEW FOREST LAW

THE latest statistics credit Indiana with less than 7 per cent of timber land. The new forestry law proposes to encourage land owners to preserve the few woods remaining by assessing them at \$1.00 per acre. This law does not subsidize forestry, because the income from a forest investment in Indiana would not justify a valuation of more than \$1 per acre, according to State Forester Charles C. Deam.

Under this law "forest plantations" and "native forests" may be classified as forest land and be assessed at \$1 per acre. The law definitely defines the number of trees a forest plantation and native forest must have to be classified.

Land to be classified must be surveyed and appraised. The cost of the survey is paid by the owner, and the appraisal by the county. The land is appraised at its true cash value, exclusive of all timber on it.

Any sized area not less than three acres may be classified. No land shall be classified that has a dwelling or other buildings on it. No grazing of any kind or amount

is permitted. The State Forester may visit classified land as often as he deems necessary, and make, in writing, such recommendations to the owner as he sees fit. The owner is compelled to make an annual report to the State Forester of such a character as he may direct. The owner can withdraw his land from classification at any time by making application to the State Forester. When application is made the owner must have the assessor appraise the land, exclusive of the timber on it, in the same manner as when entered. The first and second assessments are then compared and if the land has increased in value, the owner pays as an unearned increment tax the difference between the two assessments, which is divided among the township, county and State.

The law permits the classification of land anywhere, even if bordering a city. The timber is not taxed in any way, even when it is cut. The owner has absolute control of the cutting. He can cut any time or any amount, but when a vacancy is made in the forest it must be replanted at the first planting season.

NEWS PRINT FROM SPRUCE PINE

A NEW use for an unused wood is almost equivalent to creating a new forest, since it increases the available supply and reduces the consumption of other woods of established value. This is one of the reasons at least why so much interest has been shown in the possible utilization of southern pine for paper making, particularly newsprint, and in the printing of a recent issue of the *Birmingham Age-Herald* on paper made from "Alabama spruce pine," an interesting experiment has been brought to a head and broad possibilities developed.

For many years the wood from several species of southern pine have found use in paper making, but thus far its utilization has been confined to unbleached stocks and coarser grades, among which kraft and box boards predominated. With the temporary and exaggerated shortage of northern pulp wood, primarily spruce and balsam, which are the main eastern sources of groundwood and sulphite pulp for newsprint, renewed attention was given

to the perfection of processes which would bring the great potential supply of southern pulp woods into line for commercial utilization. The successful bleaching of sulphate pulp was accomplished in laboratory experiments some time ago, both government and outside investigators having reported a fair measure of success. The direct application of these results to commercial practice has not been announced, and naturally capital for paper production will not seek investment in the South outside of the established fields until the practicability of the processes is thoroughly established.

The spruce pine from which the *Age-Herald* was printed was shipped to Niagara Falls and converted into newsprint by a company and on machines which use Canada spruce. The product, according to the statement made in the *Age-Herald* in their issue of June 20, was made from 70% ground wood pulp and 30% sulphite pulp. In appearance the paper has a slightly more

yellow tinge than spruce newsprint, but otherwise seems to be equal to that used by many large metropolitan dailies.

Information is still lacking as to the exact species referred to as "spruce pine," and this confusion as to botanical identification prevents drawing conclusions as to the field which is actually opened up by this experiment. It is stated that spruce pine "has no practical use, and has been going to waste as a valueless product until the *Age-Herald* demonstrated its use for the manufacture of newsprint paper. It never gets larger than eight or ten inches in diameter." It is reported further that "these trees grow plentifully on high rocky soils in the Warrior River section and throughout the northwestern part of Alabama." There are some half dozen trees which in the confusion of popular names are called spruce pine, but this particular species is probably either *Pinus glabra* or *Pinus Virginia*. If the former, its range and, therefore, the supply, is distinctly limited; if it is *Pinus Virginia* or scrub pine, which is called spruce pine in parts of the South, the supply is much greater.

Whatever the exact species it seems logical that if one

pine of a pitchy nature can be made into newsprint the same process with modifications could be applied to any or all of the southern pines, thereby creating an enormous supply of pulpwood, which in the small trees has limited value for other purposes, and with the further great promise that if loblolly pine (*Pinus taeda*) can be included in the list it offers greater possibilities for rapid and profitable reforestation than other species in the eastern United States.

Future developments along this line will be awaited with interest. If it is found feasible to establish paper mills near this source of supply the practical utilization of pine for newsprint would seem assured. On the other hand, if the process is not perfected, continued operation of paper machines with resinous wood too expensive, or a satisfactory quality cannot be maintained, the laboratories will have to continue their investigations until a sound commercial basis is established. In any event, there is not likely to be any radical shift of pulpwood from the North to the South, but rather a supplementing of the northern resources and ultimate promise of continuous production from the fast-growing loblolly pine.

CALIFORNIA'S FORESTRY WORK

THE California Legislature of 1921 did more to advance the cause of forestry in California than could have been expected in view of the popular demand for economy in state expenditures, and the movement for reorganization of the state government. The latter was the cause of a hard fight to hold the state board of forestry just as it was but succeeded and there is no change. The board stands as provided in 1919 with one member representing the timber industry, one of the livestock industry, one the grain and hay industry and one at large, "which shall supervise and direct all matters of state forest policy, management and protection." Just as important as that is the fact that the personnel of the board is unchanged, former Governor George C. Pardee being the chairman. That leaves everything in the very best shape for progress.

A concurrent resolution providing for a survey of land that can be afforested or reforested, with an appropriation of \$10,000 will lead to good results, as it will lay the foundation upon which to ask for a good appropriation in 1923 for the purchase by the state of such lands, thus starting the work of providing perpetual forests. This will show owners of such lands what can be done and without any doubt many of them will begin the management of their forests in such a way as to perpetuate them. With the state and the federal Government showing the way and co-operating with timber owners there should soon be practical and successful continuous yield management under way in California.

The salaries of the state forester and his deputies were increased and \$35,000 was appropriated for a state forestry nursery. Also \$300,000 was appropriated for the State Redwood Park in Humboldt and Mendocino counties, and this means that at least that much more will be expended for the same purpose, insuring a fine area

of great redwoods to be preserved. A bill providing for instruction in the public schools in fire prevention and suppression will be a great help in keeping the importance of this work before the people and having the young folks grow up with right ideas on the subjects.

The changes in the game laws are important because they make the open seasons later in the year in most of the timber counties, so that the hunters will not be turned loose in the woods until after the first rains. The appropriation for forest protection to be used by the state board of forestry is \$75,000, an increase of \$50,000 over 1919; also there were special appropriations of \$50,000, most of which will be used in the southern part of the state. Many of the counties have already made provision for funds for fire fighting which will bring the total up to \$300,000. With the funds available for the United States Forest Service and with fire fighting measures inaugurated by owners of timberlands the state should be well protected.

Practically all the timber operators have entered into an agreement with the state board of forestry to dispose of their slash, each to do it in the most effective and economical way and then report results to the board at the close of the year. This will be used as a basis for such rules as may be needed in the future, the operators all agreeing that the time has come to dispose of all slash in order to prevent fires that would destroy the incoming timber after cutting.

The California Forest Protective Association, a wide awake and progressive organization, has been of great assistance in developing the forestry interests of the state and predicts increased attention to forestry measures by timberland owners by the general public in the future.

A LOOK INTO THE FUTURE



WHAT Roads of Remembrance may become is well shown in these pictures taken from an airplane by the Baltimore Evening Sun, which has joined the American Forestry Association's campaign for memorial tree planting along the highways of the country. The road on the right reminds one of the well shaded roads of France, those roads which the dough boy knew so well and which are famous throughout the world. The road on the left is the average American road.

The Roads of Remembrance suggestion of the Association has taken hold everywhere. The Chicago Tribune in the central west is carrying on a daily campaign for roadside tree planting. One of the last official acts of Col. F. W. Galbraith, Jr., Commander of the American Legion, was the planting of a memorial tree at Vandalia, Ohio, where the National and the Dixie Highways cross. Shortly before he was killed in an auto accident Col. Galbraith issued a call to the state departments of the Legion to push memorial tree planting. The Association suggests that a mile of the Dixie and the National highway each side of Vandalia be dedicated in his honor to commemorate the work he began so well.



THE HARD PINES OF THE NORTHEAST

BY JOSEPH S. ILLICK

THE pines are the best-known timber trees of the United States. To determine why they are so well known is not difficult. They are among our commonest forest trees, and have come in contact with the average man in so many different ways that the word "pine" is really a common household word.

Ever since the early pioneers arrived pine wood has held a prominent place in every walk of life. It would

wide range they occur on all conditions of soil from deep swamps to dry and rocky mountain tops.

And there is a third reason why the pines as a group are so well known. Few people know that there are seventy different kinds of them in the world, and that thirty-five are native to North America. This means that there are as many different kinds of pine trees native to North America as occur in the rest of the world. Only a few other groups of trees have so many representatives of economic importance. It may be helpful to tell what is meant by the term "hard pines." In the early days, names could not be coined for the different pines as rapidly as the trees were discovered, so a practical grouping of them took place. Two groups were made, namely, *soft pines* and *hard pines*. The soft pines include all the species which produce soft wood; while the hard pines embrace those species which produce relatively hard wood.



RED PINE GROWING IN THE OPEN

The needles occur in tufts or clusters at the branches.

be difficult to name a single line of development in which it has not taken part. Much of our national prosperity and personal comfort may be traced back to the glorious pine trees that originally covered extensive areas of land in all parts of our country.

There is another reason why "pine" is a real household word. It is because the pine trees are so common. They occur in every part of the country and grow upon a wide range of situations. They are at their best in temperate regions, where they can be found from sea level to the timberline,—an altitudinal range of about 11,500 feet. Some of them venture into the sub-tropics, and a few brave the cold of the far North, where they have pushed forward to places within the Arctic Circle; and in this



A THRIFTY PLANTATION OF YOUNG JACK PINE

This is on the Jacob Nolde estate near Reading, Pennsylvania



PLANTATION OF (1) JACK PINE AND (2) RED PINE
All the trees were planted at the same time, but the Jack Pine is almost twice as high as the Red Pine.

In the United States there are twelve species of soft pine and twenty-three of hard pine. The white pine is the only Eastern species belonging to the soft pine group. It has a number of other common names, among them being "pumpkin pine," "cork pine," and "soft pine."



A THRIFTY PURE STAND OF YOUNG PITCH PINE

The most typical hard pine of the Northeast has more common varieties than any other pine in that section.

Western white pine and sugar pine are the two most important Western species belonging to the soft pine group.

Twelve of the twenty-three hard pines native to the United States occur in the Eastern and Southern States. Some of them have a dozen or more common names. It

would not be possible to describe the twelve species in a single article; hence, five species of hard pine occurring in the northeastern part of the United States have been selected for special consideration in this article. Other species will be described in later numbers of "American Forestry."

The five pines considered in this article are:

- (1) Northern jack pine; also called Bank's pine. (2)



TYPICAL OPEN-GROWN PITCH PINE

It can be regenerated naturally with success and is here surrounded by a dense stand of its young offspring.

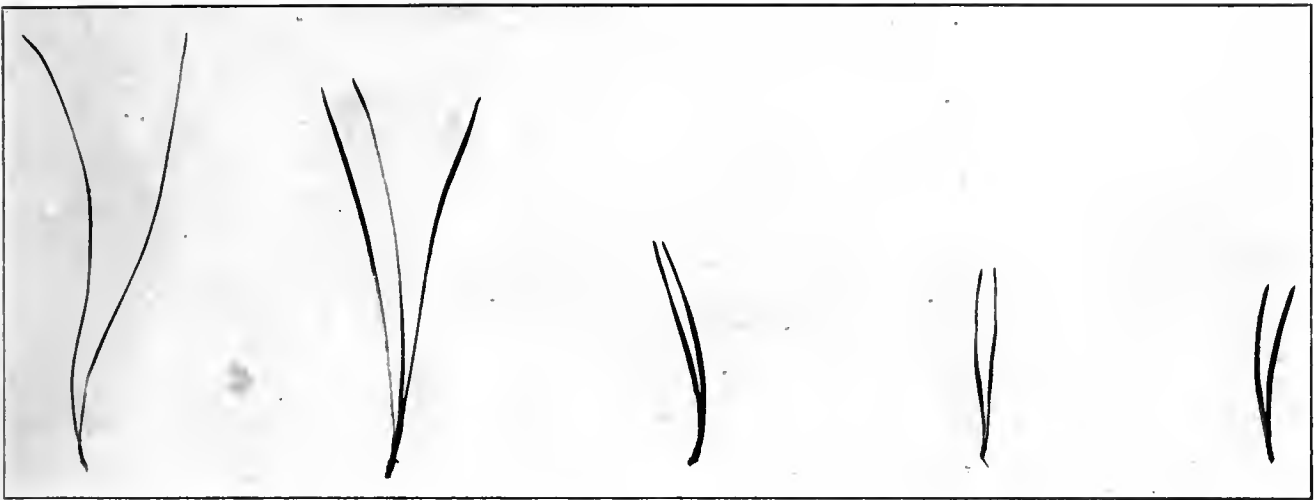
- Red pine. (3) Pitch pine. (4) Jersey or Scrub pine. (5) Table mountain pine.

The last two species are not strictly pines of the northeast, but they extend northward as far as northern Pennsylvania, and occur along the Allegheny Mountains in mixture with trees typical to the forest flora of the northeast.



PITCH PINE MIXED WITH HARDWOODS

It usually occurs so, but stands over its companions because of its fire-resistance.



THE HARD PINES OF THE NORTHEAST MAY BE DISTINGUISHED BY THEIR NEEDLES

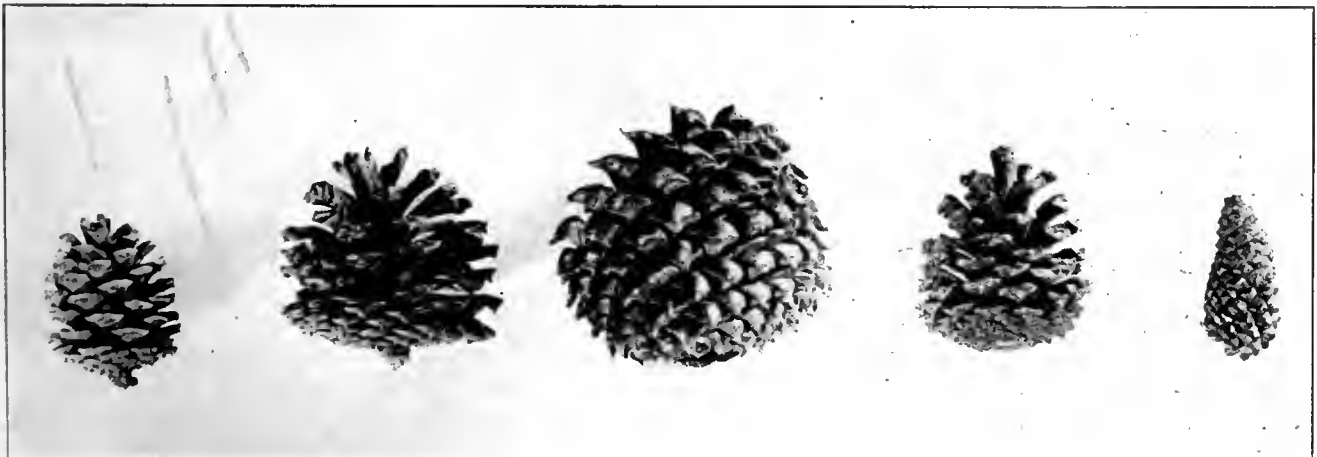
They are here shown in the following order: Red pine, Pitch pine, Table Mountain pine, Jersey or Scrub pine and Jack pine.

NEEDLE KEY*

- 1. Needles in clusters of three.....Pitch Pine
- 1. Needles in clusters of two..... 2
- 2. Needles 5 to 6 inches long.....Red Pine
- 2. Needles less than 4 inches long..... 3
- 3. Needles less than 1½ inches long.....Northern Jack Pine
- 3. Needles more than 1½ inches long..... 4
- 4. Needles straight, stiff, sharp-pointed,
3 to 4 inches long.....Table Mountain Pine
- 4. Needles twisted, flexible, dull-pointed,
1½ to 3½ inches long.....Jersey or Scrub Pine

CONE KEY*

- 1. Cone-scales not armed with prickles
or spines.....Red Pine
- 1. Cone-scales armed with prickles or
spines 2
- 2. Cone-scales armed with stout prickles.....Table Mountain Pine
- 2. Cone-scales armed with slender prickles 3
- 3. Cones 1 to 2 inches long, conic-oblong,
usually curved and pointing forward.....Northern Jack Pine
- 3. Cones 2 to 3½ inches long, sharply
conical to ovate, not curved; point
outward 4
- 4. Cones 2 to 3 inches long, narrowly and
sharply conical when closed, ovate
when open..... Jersey or Scrub Pine
- 4. Cones 2 to 3½ inches long, ovate and
more or less spherical when open..... Pitch Pine



THE HARD PINES OF THE NORTHEAST MAY ALSO BE DISTINGUISHED BY THEIR CONES

They are here shown in the following order: Red pine, Pitch pine, Table Mountain pine, Jersey or Scrub pine and Jack pine.

The above keys are simple. Each key is made up of 4 pairs of paragraphs giving distinguishing characteristics. Each pair of paragraphs consists of two alternate statements. The one is followed by the name of a tree and the other by a number. If the name of a tree follows, then it is the tree in question; if a number follows then it directs you to a pair of paragraphs further on in the key preceded by that number. If the characteristics of the tree to be identified do not fit in the first paragraph, then they will correspond to those given in the second paragraph, or else the tree in question does not belong to the group considered in the key.

Many interesting things may be said about these five pine trees, but before an attempt will be made to describe some of their interesting habits we want to find out if we really know these trees. In order that we may be positive about our acquaintance with them these two simple keys have been prepared. They will enable anyone to identify these five pines with certainty. The one key is based upon leaf characteristics, and the other upon cone features.

The jack pine extends farther north than any other American species of pine. It reaches within one and one-half degrees of the Arctic Circle and extends southward to the southern shores of Lake Michigan. Its north and south range is about 1,600 miles, and its east and west distribution covers about 2,500 miles.

Jack pine is almost a trans-continental species, extending from Nova Scotia northwestward to the southeast corner of the Yukon region. It is distinctly a tree of the north woods, that is, a Canadian tree, reaching its best development in northern Ontario and Quebec, and in Manitoba, Saskatchewan and Alberta. Some of the finest stands occur west of Lake Winnipeg.

The jack pine is rather scrubby towards the limit of its distribution. In the northern part of its range it is a mere shrub, and in the extreme southern part of its distribution it is a small tree of little commercial value.

Jack pine is also known as "Bank's Pine" and "Gray Pine." It is easy to identify it for it has a number of striking distinguishing characteristics. Its needles are very short,

usually less than one and one-half inches long. They occur in bundles of two and are often somewhat clustered at the end of the twigs. No other pine native to eastern North America has such short needles. Just why this tree has such short needles is a debatable question. It may be the result of evolution, or we may speak of it as special adaptation to the environment in which the tree lives. Throughout the entire region in which this tree is native the snowfall is heavy. If the tree produced long needles, it is quite probable that large quantities

of snow would be held upon the tree, and as a consequence enormous pressure would be developed upon the branches, with the result that many tree crowns would be completely crushed. The development of short and smooth needles prevents the accumulation of large quantities of snow on the leaves, and thus prevents possible great damage by snow pressure.

The cones are equally as distinctive as the needles. Unlike those of most other pines they occur near the end of the season's growth. They are from one and one-half

inches to two inches long, bear no stem, are lop-sided in form, and pointed at the apex and conical in outline. As a rule, they are held in an erect position upon the branches and may remain closed for many years. One of the most distinctive features of the cone is the fact that they are more or less curved, that is, lop-sided, and persist for many years after they reach maturity.

We have been taught that the jack pine is an inferior tree. The name "Jack" at once conveys an impression of inferiority. While it is not one of the most important commercial timber trees of the northeast, yet it has many merits, and the longer and better we know it the more will we appreciate it. One of its commendable habits is that of pioneering. After an area has been lumbered over heavily or burnt over repeatedly, jack pine is one of the first trees to go in upon the area and establish itself. It leads the way to natural re-forestation and makes possible a successful establishment of other valuable forest trees.

Jack pine has other good points. Among its merits are rapid growth when young, and its adaptability to poor sandy soil. When young the tree grows far more rapidly than most of the eastern evergreen trees. The growth of a season is not laid on in one continuous operation, but is usually laid on in installments. The trees grow for a while, then rest and later grow again. All this takes place in the same season. The total growth of a season is considerably greater than that of many other trees. In a mixed plantation of white pine, red



A CLUSTER OF NINETEEN PITCH PINE CONES

Such a large cluster is very rare. The cones usually occur singly or a few in a cluster. They often persist for many years.

pine, jack pine, the jack pine trees were twice as high as the red pine and three times as high as the white pine at the age of eight years.

While the tree does not attain an exceptionally large size or produce unusually fine lumber, yet it has good possibilities of profitable utilization for pulp wood, box board, mine timbers, and other low-grade material. A pulp mill located in Pennsylvania, having a capacity of 150 cords per day, uses jack pine from Canada almost exclusively.

More than 1,000,000 jack pine trees have been raised in nurseries operated by the Pennsylvania Department of Forestry. All of them have been planted upon privately-owned or State-owned forest land within the State. Among the oldest plantations of jack pine in Pennsylvania is a large one located on the Jacob Nolde Estate, a few miles south of Reading. The trees are growing rapidly and good financial results are promised by the entire plantation.

While the jack pine is only an ordinary tree it deserves a place in our forests, and if planted upon proper sites and handled carefully, will produce much wood which we need and can use. Let us not forget that it is with trees somewhat as it is with man. Most of the work in the world is done by ordinary men, so most of the wood will be produced by ordinary trees.

The red pine is a valuable timber tree. It has a number of common



BARK OF THE RED PINE



BARK OF THE SCRUB PINE

names, probably the commonest one being "Norway Pine," a name wholly out of place because it is not a foreign tree, but a native of our northwoods. It is said that the name "Norway Pine" was given to this tree by a Spanish sea captain, who thought that he saw some resemblance in it to the pine trees he had seen in Norway. This supposed resemblance caused him to suggest the inappropriate name of "Norway Pine," which has persisted until today and will, no doubt, continue for a long time to come.

The next commonest name is "Red Pine." This is an appropriate name, for the bark of the tree is of a reddish hue, and the heart wood is usually pale reddish in color.

This tree is equally as unfortunate as the jack pine in having an inappropriate scientific name—*Pinus resinosa*—meaning *resin pine*. Why it was given this name is indeed strange, for its wood contains less resin than any other pine. "Red Pine" is the name by which this tree should be known. The wood of red pine is of a superior quality and used for most purposes for which white pine is used. The similarity of the wood to that of white pine is responsible for another false common name, namely, "White Pine." Some dealers mix red pine wood with that of white pine, and palm off all of the material as white pine, and the consumer, as a rule, does not know the difference. Red pine is easy to identify. It is a tree of the northwoods, extending as far south as northern Pennsylvania and the Lake States, and being at its optimum in the northern part of the Lake States and the southern provinces of Canada. It may reach a height of 70 or 80 feet, and a diameter of three feet.



BARK OF THE PITCH PINE

Probably the most distinctive parts of the tree are its needles and cones. The needles are slender, flexible and from four to six inches long, and occur in clusters of two, being surrounded at the base by a thin membranous coating or paper-like wrapper. If one views the tree from a distance the needles occur in tufts or clusters at the end of the branches. This characteristic is very helpful in distinguishing the tree from a distance.

The cones are about two inches long. They occur at the end of the season's growth and their scales are *not armed* with any spines or prickles. It is the only pine tree native to eastern North America whose cone-scales are unarmed. In addition to the leaf and cone characteristics which should enable one to identify the tree at any season of the year, its general form and appearance, as well as its distinctive bark, will help to identify it. It is one of the most attractive coniferous trees of the northeast, and its bark is reddish in color and marked with shallow fissures.

Special efforts should be put forth in protecting forest land upon which red pine occurs, and where it is absent it may be planted. During the past ten years more than 1,000,000 red pine seedlings were planted on the State Forests of Pennsylvania about 700,000 seedlings and transplants have been supplied by the Pennsylvania Department of Forestry to private planters throughout the State. This does not include all the red pine trees planted within the State, for additional trees procured from commercial nurseries were planted on privately-owned forest land. It seems fair to estimate that at least 2,000,000 red pine trees have been planted in Pennsylvania, and most of them are making a satisfactory growth.

Red pine is one of the most important timber trees of the northeast, and as time goes on its real merits will become better known. This valuable and promising forest tree should be carefully protected and managed, and

its range extended by planting seedlings or transplants on our devastated mountain slopes. They will grow rapidly and produce considerable quantities of high-grade wood which we need and can use for essential purposes.

Pitch pine is probably the most typical hard pine of the northeast. It is truly a hard pine, and occurs generally throughout the northeastern part of the United States. It may be said that the Canadian boundary line is its northern limit, for it occurs only in a few places in Canada. It reaches its best development in Pennsylvania, and extends southward along the Allegheny Mountains to North Carolina and Georgia.

Pitch pine possesses more common names than any other pine in the northeast. It has at least a dozen. Here are some of the common names by which it is known:

Pitch pine, jack pine, black pine, nigger pine, torch pine, yellow pine, hard pine, scrub pine, bull pine, long-leaved pine, rich pine, and fat pine.

Most of the common names refer to some distinctive feature of the tree or to its wood. The names "black pine" and "nigger pine" refer to the dark bark which is found upon young and middle-aged trees and upon fire-scarred trunks. This tree is the most fire-



A PROMISING PLANTATION OF SCOTCH PINE

Scotch Pine will grow satisfactorily upon almost any soil, except hard clay, swampy or peaty soils, and it has been planted extensively through the Eastern United States.

resistant pine in the East. Forest fires will naturally kill small seedlings, but as soon as the trees reach sapling-size they develop a heavy bark which makes them extremely resistant to fire. Forest fires have burned over extensive forest areas, apparently killing every living thing found thereon, but upon examining the area a year or so after the fire, one is amazed to find that many of the medium-sized and larger pitch pine trees have entirely withstood the heat of the fire and are still thrifty.

The name "torch pine" was given to this tree because it supplied the earlier settlers with pine knots which were used extensively as torches about homesteads and for traveling at night. The name "yellow pine" refers to old and mature specimens which have lost their typical blackish



TABLE MOUNTAIN PINE

This is growing on rocky cliffs along the Susquehanna River in Pennsylvania.

bark, and subsequently developed a yellowish bark. The names "rich pine" and "fat pine" are local. They were given to this tree because many old specimens are often *rich in fat*, which is a local way of saying that the tree is resinous. The name "long-leaved pine" is quite appropriate, when one is considering only the pines of the northeast, for some specimens of pitch pine develop needles which are much longer than any other pine in the northeast. It is not unusual to find trees bearing needles which are six or more inches long.

No hard pine native to eastern North America is easier to identify than the pitch pine, for it has a few positive distinguishing characteristics. Its needles occur in bundles of three and are from three to five inches long. All other hard pines of the northeast have their needles in bundles of two, and they vary considerably in length and texture from those of the pitch pine.

The bark of pitch pine is scraggy in appearance, and broken up by irregular fissures. Early in the life of a tree the bark becomes quite thick and consequently after

they have reached the sapling age the trees are very fire-resistant. In young and middle-aged trees the bark is very dark to blackish in color, while in old and mature specimens it may become yellowish. The trunk may be covered with gnarled branches, and occasionally with dense mats of leaves. It is the only pine which produces these dense formations of leaves along the main stem so that they appear like unbroken mats, often completely enveloping the trunk.

The cones are from two to three and one-half inches long and more or less ovate to spherical when opened. They persist for many years. Many individual trees may be found loaded down with thousands of cones which have persisted for many years. In case of heavy snowfall, these cones make an excellent place upon which the snow may rest, and consequently it often accumulates in such enormous quantities that often many branches are broken off and sometimes entire crowns are completely crushed.

From a commercial point of view the pitch pine is not so important as the white pine, but it is gradually gaining favor, for new and better uses are being found for its wood continuously. In the early days when white pine lumber was plentiful, the pitch pine was despised. No one cared to handle such an inferior wood. But market



A FINE SPECIMEN OF TABLE MOUNTAIN PINE

Probably the largest specimen in the world. It grew on Pine Mountain, Mont Alto State Forest in Pennsylvania.

and forest conditions have changed. White pine is now very scarce, and unusually high in price. The best timber has been removed from our forests, and consequently we are beginning to be satisfied with ordinary wood. Pitch pine is an ordinary wood, but it has already won a place on our market, and as time goes on it will move forward into even a better position. It is also fair to assume that its wood will improve in quality when the trees from which it is derived are raised under good forest management.

In addition to being fire-resistant and producing a fair grade of wood, pitch pine has other merits. It grows naturally in close association with rock oak and chestnut, and consequently it is one of the trees that will help fill up the vacancies made by the chestnut, which is disappearing rapidly from our forests because of the destructive work of the chestnut blight.

It is important that we should not condemn the pitch pine or any other ordinary tree without studying their silvical habits fully. Until a few years ago pitch pine was regarded as a slow grower, and because of this belief is called "jack pine." The writer made a special study of the growth of pitch pine and found that it grows faster than is first apparent, for instead of placing its growth of a season at one time, it lays it on in a number of installments. This installment method of growth caused many observers to conclude that the tree grew slowly, for they thought that each installment represented a year's growth, while, in fact, each year's growth embraced from two to three installments, and the real total growth of a season was considerably greater than the apparent total growth.

Scotch pine is known to the foresters of the world as a fast-grower in youth. No attempt will be made to disprove this statement, but it is only fair to the pitch pine to state that in a mixed plantation of Scotch pine and pitch pine, located in Central Pennsylvania and averaging 15 feet in height, the pitch pine are keeping their tips abreast with those of the Scotch pine.

Among the pine trees that possess unfortunate common names is the "scrub pine." The word "scrub" implies that the tree is undesirable as a forest tree and produces

inferior wood. The wood which it produces is inferior to that of the white pine and other important pines, but this does not imply that the wood is not of a satisfactory quality for use in our wood-using industries. In fact, the wood of this tree is being used more extensively each year for pulp, shipping crates, and general construction work. A few years ago more than 20,000 board feet of scrub pine were cut in a woodlot in north-central Pennsylvania and used in the construction of one of the most up-to-date barns in the Keystone State.

This tree is also called "Jersey Pine," because it was reported as abundant in parts of New Jersey, where pine forests occur over extensive areas known as the "pine barrens." Recent investigations, however, have shown that most of the trees in the pine barrens are pitch pine and not Jersey or scrub pine. Another name applied to it locally is "slate pine." This name was given to it because it occurs locally on slatey shale soil.

In several respects the scrub pine resembles the jack pine, but the two trees can readily be distinguished from each other. In order to prevent confusion between them the one is sometimes called northern jack pine and the other southern jack pine. Fortunately, the two trees do not meet in their natural distribution. Jack pine is a tree of the north woods, and scrub pine is a tree of the sunny southlands.

The occurrence of the scrub pine may also help to identify it. It is neither a tree of the coastal plains nor of the high mountain lands, but prefers the rolling uplands between these two extreme positions, and

is common and seems to thrive upon rather dry and sandy soil.

Scrub pine has many striking distinguishing characteristics, by means of which it may be recognized. Its needles occur in pairs. They are twisted, spread widely from each other and are from two to three inches long. No other pine tree has needles which are so twisted and spread so widely. If one takes a position under a tree and looks up into its crown, the light seems to be uniformly screened by the evenly distributed leaves. This type of leaf distribution is entirely different from some other pines, particularly the red and pitch, which have their needles clustered or tufted at the end of branches.



YOUNG PITCH PINE

Showing clearly the erect, very attractive candle-like new growth by the installment method.

The branchlets also have distinctive features. They are smooth, purplish, tough, and usually wavy—not stiff and straight as those of the other pines. The bark on the trunk is smoother and redder in color than that of any other native pine. The cones are narrow and conical, rather sharp-pointed, and persist for several years.

Scrub pine may be regarded as a pioneer tree, for it is one of the first trees to march out from its forest habitat and reforest abandoned fields. There are thousands of acres of farm land throughout its range which were abandoned and have since been completely occupied by it. The resultant trees cannot be placed in a class with the forest giants, or sylvan monarchs, but they reach an average size and will produce lumber which can be used to advantage for ordinary purposes.

One of the least known of the hard pines of the East is the table mountain pine. For a long while it was thought that this tree occurred only upon the high table lands of the southern Allegheny Mountains in North Carolina, Tennessee and the Virginias. But about the time of the Civil War a few specimens were discovered in Pennsylvania. Now it is known to

occur in many places within the State, extending as far north as Clinton county and northeast to Berks and Schuylkill counties, these points being the northern limit of the trees' entire range.

This tree is also called "Poverty Pine" because it grows and usually thrives on poor, rocky and shallow mountain soil. It is an aggressive tree, and consequently becomes a good competitor with other trees upon poor and exposed situations; but it makes its best growth when standing in mixture with hardwoods upon rather fertile soil.

What is probably the largest known table mountain pine tree in the world grew up on a mountain side near Mont Alto, Franklin County, Pennsylvania. This specimen is 73 feet high, 23 inches in diameter at breast-high, and free from branches for a distance of 40 feet above

the ground. It stood among a mixed stand of chestnut, oak, and other hardwood trees.

While this tree is typical of our highland forests, it is found locally at low elevations. The writer recalls finding the tree growing upon an island in the Susquehanna River only about 200 feet above sea level, and its roots washed almost continuously by the flowing water. Numerous specimens occur upon the islands of the Susquehanna River and the adjoining river hills of York and Lancaster counties in Pennsylvania.

Few trees are easier to identify than the table mountain pine. Its needles, which are present at all seasons of the year, occur in pairs, are very stout, stiff and extremely sharp-pointed. No other pine native to eastern North

America has such sharp-pointed needles. Its cones are equally distinctive. They are coarse in appearance and bear cone-scales which are armed with stout spines. They are from three to four inches long and usually occur in clusters of three, five or seven, and sometimes more. These distinctive cones often persist for many years. No other pine native to North America has cones similar to those



A TWO STORIED FOREST OF SCOTCH PINE IN EUROPE

One of the major forest trees of continental Europe. This is what may be expected if it is planted and properly cared for.

of the table mountain pine. The preference of this tree for poor rocky soil and exposed situations may also help to identify it. When grown in the open its lateral branches persist on the main stem all the way down to the ground, but if grown in dense mixed stands the trunk becomes clean, and the resultant wood is quite satisfactory for general use.

The table mountain pine cannot be classified as a commercial timber tree of much importance, but it should not be despised for it has some merits. As forestry practice becomes more intensive this tree will be utilized in protection forests on steep mountain slopes where it will help prevent erosion and build up productive forest conditions and at the same time produce wood which may be used to advantage for ordinary purposes.

There is a foreign species of hard pine that has been introduced so extensively in the northeastern part of the United States that it may be regarded as a naturalized member of the forest. It is the Scotch pine, a native of Europe, where it extends from the Sierra Nevada Mountains of Southern Spain and Northern Italy to latitude 70 degrees on the west coast of Norway; thence, east through Lapland and Siberia, along the Arctic Circle to the region of the Amur, and thence through Asia Minor to Persia.

Scotch pine has taken a prominent part in the development of European forestry. It is one of the major forest trees of continental Europe, where it has been given a forest trial extending over more than 100 years, and during that time has shown up some commendable silvical traits. Its rapid growth during youth has been heralded widely, and probably is responsible for an over-estimation of its real commercial value. It does grow rapidly in youth, but just like a horse which leads at the end of the first heat is not always the winner of a race, so the forest tree which leads in height-growth at the end of the first or second decade will not necessarily rank first at the end of the rotation—the harvest time of the forest crop.

Scotch pine has been planted widely throughout the eastern part of the United States. During the past fifteen

years more than one and one-half million trees of this species have been planted upon the State Forest of Pennsylvania. Most of them are making a satisfactory growth, and experience has shown that Scotch pine is very modest in its soil requirements; hence, well adapted to the sandy soil so common on the mountain sides of the northeast. It will grow satisfactorily upon almost any soil, excepting compact clay and swampy or peaty soils, but thrives best in a deep, loose, and rich sandy soil.

Scotch pine may be distinguished from the pines native to the northeast by the reddish appearance of the upper part of the trunk and adjoining branches. The bluish green leaves which are $1\frac{1}{2}$ to $3\frac{1}{2}$ inches long, and the backward pointing cones are also distinctive. It has rougher twigs than the Jersey or scrub pine, and its needles are shorter than those of the red and pitch pine, longer than those of the jack pine and scrub pine and blunter-pointed than those of the table mountain pine.

All the trees described in this article may be classified as ordinary forest trees. None of them are "super-trees" but all are worthy a place in our forest structure, and if protected carefully and handled properly will produce wood and other forest products urgently needed by man.



HOW TO TELL THE SCOTCH PINE

The needles are grouped in clusters of two. The cones occur at the end of a season's growth. Note drooping small cone at end of new growth bearing pin-featherlike clusters of needles.

THE PINE AN EMBLEM---BY F. ROGER MILLER

THE American people have grown wonderfully in unselfish service—in Christian service. I wonder if we fully realize just how much we have grown! To me the Southern Pine is emblematic of our progress.

The seed springs into life amid the shadows of the ancient forest; the plant so tiny, so delicate that it is lost in the tangled grass that surrounds it.

With fertile soil below and a ray of sunshine from above, it begins to climb and climb and climb. And one day it stands alongside the sturdy oak a century old.

But the growth of the pine is ever upward, and it continues to climb heavenward until its plumed head towers above every other tree of the forest, and the pine looks out upon the whole world.

A few years ago the American spirit of service was

born beneath the shadows of Conservatism, and amid the tangled bramble of Individualism and Commercialism. Selfishness surrounded us on every side, and the winding trail through the forest was a narrow rut left by the wheels of Custom and Habit.

Today our vision extends beyond the distant horizon. East and West, North and South, and to the remote corners of the globe.

And we respond to every call for service, whether it be from the homeland, or the forgotten places of the earth.

As the pine yields its all to the betterment of humanity and to the progress of civilization, so we are learning that we came into life that we might leave the world better than we found it, that our value upon earth is measured solely by the service we perform.

EVERGREENS

BY F. L. MULFORD

EVERY house needs certain attributes in addition to the presence of a family in which love abounds, before it becomes a real home in appearance as well as in feeling. Among these is greenery about it and shade over it. With these accessories a very simple house may be made to appear homelike. This can be done with little expense for any house except one that is built close against the sidewalk and its neighbors in the heart of a

evergreens, especially if plants with bright-colored barks are freely used and are appropriately arranged, yet the addition of a few evergreens in the planting adds a touch of green that to most people is very pleasing in mid-winter. A large proportion of the plantings about a home may be of these plants and attractive results may be obtained. Where there is room for a dozen or more plants it probably is not desirable to make the plantings



A BEAUTIFUL PLANTING FOR THE ODD CORNER

A group of holly with locust as a background. The thinness of the middle holly is due to its having been transplanted recently. Soon the thick, glossy leaves will come into their own and the bright colored berries make holly a delight in winter.

city. A tree or two would provide the shade and the seeds of a few annuals would provide the other green for a summer. Of course, for more permanent results woody material should be used that would provide some winter effect even when it had no foliage, and would give an adequate setting earlier in the spring than could be provided by plants grown from seeds each year.

Although a good combination of deciduous shrubs may give a very pleasing effect during the winter without any

entirely of cone-bearing trees, like the spruces, pines and cedars, as the result is liable to be too heavy and sombre, but such plantings should be varied by the use of a few deciduous plants, which would add variety both winter and summer.

Evergreens are of two distinct types; the cone bearing trees, which have needles instead of leaves, and the broad-leaved evergreens like holly, box, magnolia, cherry, laurel, mountain laurel and rhododendron. The cone-



BEFORE PLANTING

No matter how attractive the house may be, the foundation lines need to be softened by ornamental planting, and in this instance a simple but beautiful effect was secured through the use of both deciduous and evergreen shrubs.

also a difference in its arrangement on the branches and in the direction of the growth of the branches that make what is called difference in texture of the plant as seen from a little distance. The difference in texture of the foliage of the broad-leaved evergreens may possibly be somewhat less than with the coniferous trees but then most of them have showy flowers or berries.

Both broad-leaved evergreens and cone-bearing plants have freak forms, the use of which should be largely avoided. Among them are those with variegated leaves, as well as those with yellow and with blue foliage. Among the most abused plants listed by nurserymen is the Colorado blue spruce in its various forms. There are places where one of these plants may be used to advantage with a group of twenty or more other evergreens, but its use alone in the middle of a lawn or with a group of a half dozen or less other trees is not warranted from the standpoint of good taste in planting.

Nurserymen list the evergreens that prove most successful in their respective localities and reliable nurserymen are careful in their descriptions of the kinds that they handle so that the catalogues of near-by reliable nurserymen are the safest available source of information on kinds to use in any community. The trademark "Trustworthy Trees and Shrubs" is coming to be a guide in the selection of reliable nurserymen, as a large majority of the membership of the American Association of Nurserymen that has adopted this trade mark are



AND THE CONTRAST AFTER PLANTING

Abelia, a broad-leaved evergreen of the South, was placed to the left of the steps. Hemlocks to the right. Crape myrtle, hardy phlox, trumpet vine and climbing roses at the left corner, and the "house" was transformed into a "home."

bearing trees are characteristic of the north, the forests of the extreme north being composed almost exclusively of these trees, while the broad-leaved evergreens are characteristic of the south, there being a long list of kinds available for southern planting that leaves little to be desired in material to provide variety. In almost all of the United States some species of both types can be grown, although the coniferous trees in greater variety are available for the north, while the broad-leaved evergreens are more abundant for the south.

There is a great difference in the general appearance of the various species in the different groups. Not only is there a difference in the green of the foliage but there is

endeavoring to restrict its use to those firms who deal fairly and honestly with their customers. It is believed that this, in a few years, will be a dependable guide for intending purchasers.

August is the time to consider the transplanting of evergreens if it is to be done before winter. The season for their transplanting is different from that for deciduous trees unless unusual care and attention is given to the plants in their new location. This is due to the difference in the character of the plants. Deciduous plants, that is those that shed all their leaves in fall or early winter so that for several months the branches are destitute of foliage, are spoken of as dormant during this sea-

With evergreens the condition is different, as the branches are continually covered with foliage during the life of the plant, the new leaves appearing before the old ones drop. In fact, with some trees there may be three or more crops of leaves on the tree at the same time. These leaves are continually giving off moisture, or, as it is called with leaves, transpiring it. This is going on continuously, more actively when the tree is in active growth or when the atmosphere is dry or the wind is blowing, but to a considerable extent all the time. It is because of this greater need for water that evergreen plants need to be handled differently from deciduous plants.



AN ATTRACTIVE PLANTING OF EVERGREENS ABOUT A HOME

Boxwood and red cedar at the left. Retinospora at the right. Some houses lend themselves best to the entire use of evergreens, and this is an instance of most effective foundation planting, with a distinct dignity and personality.

son. In other words, the life processes are at their lowest ebb and the external demands of the plant are the least of any season, though they cannot be said to be suspended, as certain processes continue even under these conditions. For example, there is a constant evaporation of water from the tops of deciduous plants all through the winter and if the amount supplied the top by the roots is unduly curtailed for any reason the top suffers and may even die. But the amount of this evaporation is so slight in many parts of the country that these trees may be transplanted at almost any time during the so-called dormant season with reasonable assurance that the roots will be able to supply sufficient moisture to keep the tops alive.

The time for transplanting evergreens is when the conditions are most favorable for the active formation of new roots combined with the smallest demand of the leaves for moisture. The need for active root growth is so that the plant may as promptly as possible become established in its new location while the desirability of selecting the time of least demand by the leaves for moisture is so that the roots will be required to furnish the least possible amount of water until they have regained efficient contact with the soil.

One of the seasons for meeting these conditions is as early after mid-summer as the late summer or fall rains begin, at least in those sections where winter conditions

will permit of such late planting. This condition prevails in the stippled areas of the accompanying map, which is seen to be about one-third of the eastern part of the country and on the Pacific Coast. In the latter region the planting season begins much later than on the northern Atlantic Coast. Transplanting may continue as late as the ground will be sufficiently warm to induce root formation. Usually the latest advisable date for transplanting evergreens is about the average date of the first killing frost.

Because of this necessity of constantly supplying an abundance of moisture evergreens need to be transplanted with a large proportion of their roots in contact with the soil so they will be kept actively functioning. Therefore they are transplanted with a ball of earth adhering to their roots, except in the smallest sizes, which are too small to be of value as ornamentals.

Holes for the planting of evergreens should be prepared before the arrival of the plants so that there need be no delay in planting them on arrival. The holes should be larger than the balls of earth in order that there will be a liberal layer of good soil all about the ball in which new roots may have an opportunity to grow. This layer of soil should be under the ball of earth as well as at the sides. Sufficient well-enriched top soil should be at hand to entirely fill all the space about the ball of earth. The best material for adding to the top soil is well-rotted manure followed in desirability by prepared stock-yard

manures, ground bone, fish scrap, tankage, and cottonseed meal.

Before placing in the hole the outside wrappings and packing material should be removed, but the inside burlap that has been used to help the ball of earth should not be untied. After the plant with this burlap has been placed in the hole a few slits should be cut in the burlap with a sharp knife and then the soil should be packed firmly about the balled plant, burlap and all. After the hole is two-thirds filled with well compacted soil then a liberal supply of water should be added. After this has soaked away the hole should be entirely filled with soil without any farther tamping or tramping. After this is done the ropes that held the burlap in place may be removed and any of the burlap that protrudes above the ground may be cut off. The burlap is left on the ball of roots to prevent any farther loosening of the contact of the roots with the original soil than can be avoided. After having been shipped a considerable distance, with often much handling, and that not always of the gentlest, soil will often come off that up to this point has remained in apparently good condition. Nothing would be gained by removing the burlap, as roots would grow through it even without cutting holes in it, and at longest it would only take a short time for it to rot.

Of course in placing the tree in the first place it is important that it shall be straight before any soil is filled about it. After the hole is filled the tree should be tied



A MIXED GROUP OF DECIDUOUS SHRUBS AND EVERGREENS

This delightful corner is achieved by a mixed planting, and a pleasing, artistic and restful effect has been secured. At this spot the heavy coniferous evergreens alone would have been far too somber.

so as to prevent winds from shifting it from that position, if it is more than 5 feet high or is in an exposed position. It is more difficult to get a tree back in proper position after it is once planted than to keep it so, although the precautions necessary may seem useless at the time. After setting the plant frequent waterings will enable the remaining roots to supply sufficient water until new roots form. A spraying of the tops several times a day is also an assistance in helping to maintain humid atmosphere about the foliage and thus reducing the amount of evaporation. This is not imperative except with large trees or in dry climates. In localities subject to persistent drying winds a protection on the windward side of newly-planted trees is helpful. This could be made of a framework of light lumber covered with burlap. In the humid climate of the Atlantic seaboard such a protection is seldom necessary.

In selecting trees for transplanting nursery-grown stock is preferable, although there are times and conditions when collected stock can be used to advantage. Due to frequent transplanting, the root system of nursery stock is compact with many fibrous roots so that it can be dug easily with a ball of earth that preserves intact a large proportion of the roots of the plant. With the wild plants that may, upon occasion, be collected for planting, the root system consists of a comparatively few roots that have run to long distances in search of food. When these plants are dug, usually a large proportion of these roots are cut off so that only a small proportion of them are secured with the plant, hence the chance of success is much reduced. With very small sizes or by special methods of handling larger sizes it is possible to succeed in transplanting collected trees, but the loss in transplanting is usually very much larger than with nursery-grown stock.

It is not desirable to trim well-grown evergreens at this time. Carefully grown plants are frequently transplanted in the nursery, so that the roots are pruned and encouraged to grow in a compact fibrous mass. When this is followed by careful digging and balling it insures the retention of such a large proportion of the root system that a reduction of the top to balance root loss is not necessary. Further, the character of growth of a large proportion of evergreens, including most of the cone-bearing trees, is such that but little pruning can be done without ruining the shape of the tree. The growth of the most of such trees is from the young wood and if this is destroyed they will seldom start new growth from the old wood in the way that most deciduous trees will do. Therefore, the only pruning that can be done is to trim off some of the young wood, being sure to leave sufficient for the continuation of the growth of every branch. For formal effects, of course, pruning is necessary but this

must be done regularly, for if the plant once gets too big there is no trimming it back and beginning over again, as can often be done with deciduous plants, or with many of the broad-leaved evergreens, as holly, box, magnolias and a host of other southern plants.

In order to keep the trees growing well it is desirable to give frequent applications of well-rotted manure to the cone-bearing trees and to keep them well cultivated or well mulched. The same treatment is good for many of the broad-leaved evergreens also, but such plants as rhododendrons and mountain laurel should have annual mulches of oak leaves and no cultivation of the surface of the ground under any circumstances, and no lime or



A GUIDE FOR TRANSPLANTING

The stippled areas show where late summer or fall transplanting may be done with a good prospect of success.

wood ashes even in minute quantities. If the mulch of oak leaves is sufficiently heavy no objectionable weeds will grow, but if weeds should grow they could be pulled without hoeing the surface.

If ornamental plantings are well made it is usually not desirable to stimulate a rapid growth after the plants are well established. On good soil they will usually maintain themselves in good condition without cultivation and with only an occasional application of manure on the surface. As a rule, the principal attention needed is to watch for possible insect attacks and to thin the plantings before they begin to overcrowd. In order to get quick effects all plantings are apt to be made too thick for the ultimate stand. This is entirely proper but attention should be given to thinning as soon as the plants begin to touch, so that the permanent trees will not be ruined before it is done. In the final arrangement it is entirely appropriate for the plants to grow together and somewhat crowd each other, but this should not be permitted in the younger plantings before they have had their final thinning.



TREE STORIES

JUPITER AND THE OAK

By Mary Isabel Curtis



WHEN the Romans, long ago, believed in many gods they worshipped Jupiter as king of all their gods and goddesses. The oak was Jupiter's especial tree and this is the story of how he came to choose it for his own.

There was a band of giants called the Titans, who were Jupiter's cousins and who disputed with him his right to be the king of all the gods. After a great battle Jupiter and his followers conquered the Titans, and Jupiter became the supreme god. But it was a terrible struggle because the Titans were of such gigantic size and had such enormous strength that they were able to pile mountains upon mountains in order to reach up to Heaven and throw Jupiter down, which was what they were trying to do.

After the battle was over, Jupiter was resting in the shade, when suddenly one of the Titans managed to force his way to where the god was sitting, and, rushing up, tried to kill him.

Jupiter seized his great sword and thrust it through the Titan's body and when the giant's blood fell upon the ground a mighty oak tree sprang up right where he had been standing.

"This is the king of trees," said Jupiter, "and I am king of all the gods. From this time the oak tree shall be known as mine, and everywhere it grows men shall remember that I made it mine by conquering my enemies."

This is the story of the oak tree; but there is a little more to it, because this oak, or another one exactly like it, became a very wonderful tree indeed. It lived for many, many years and was known as the Talking Oak of Dodona. When anybody needed help he would go to the Talking Oak and ask what he should do. Then through the rustling and whispering of its leaves he could, if he were clever enough and could listen hard enough, make out a voice, and this voice would tell him just what would be best for him to do.

I wish, in these days, we could have a talking oak—Don't you?



THE SNEEZELESS LAND OF DACOTAH

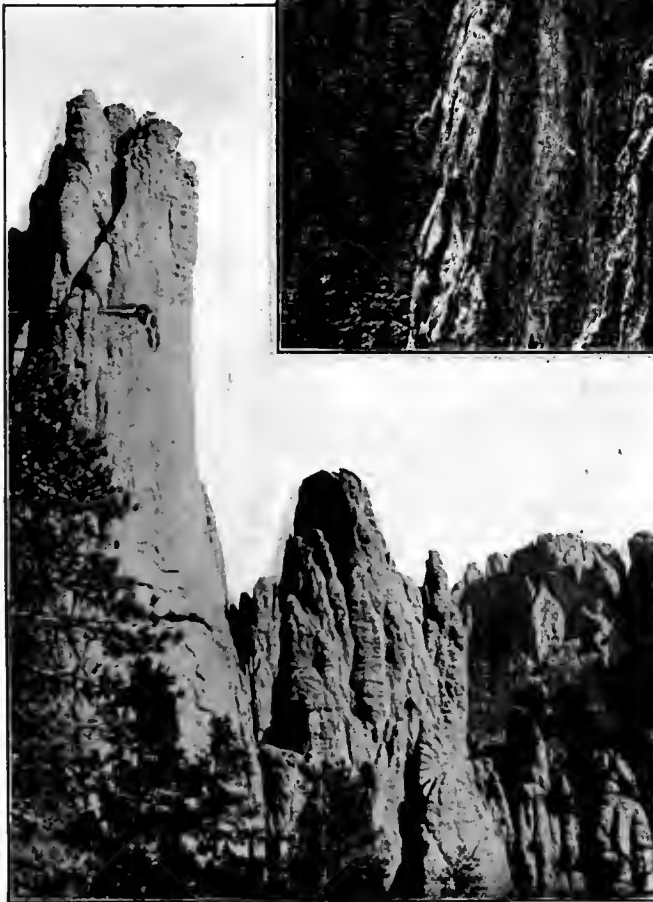
BY EARL H. EMMONS

WHEN the corn is in the whiskers and the hay is in the stack and the pollen blows profusely, how does it make you feel? Do you snap your lily-white fingers in its face and give vent to a loud and ribald laugh, or do you sneak down alleys with a couple handkerchiefs in each hand, kachooing at every step and wishing you were dead?

If you are of the latter type, then list to the tale of a land that is sneezeless, and if you belong in the former category trail along anyway—you will enjoy the scenery. I am about to refer to that glorious region so little known east of the Mississippi and west of the Rockies—the Black Hills. You may have heard of them through your geography or history. Anyway, in all probability, your ideas are wrong.

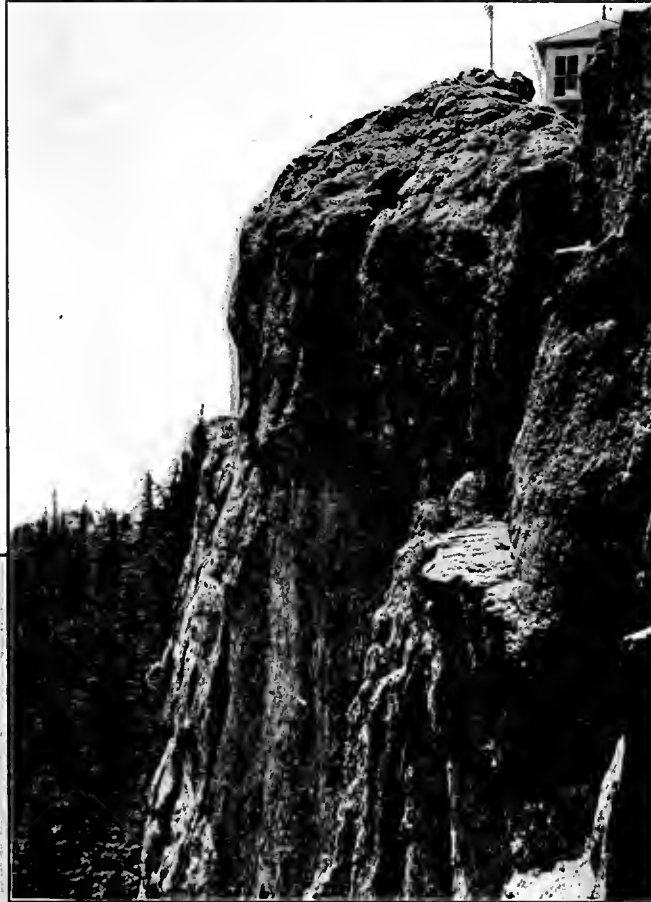
In the first place, the Black Hills are not black at all. They are a very dark blue and green and sometimes purple, which shades off to gray and yellow, but no black. Neither are they hills,

unless you call most of the Rockies and all the chains eastward hills, because the altitude here is higher than many of the peaks in the Rocky range and higher than anything between the Rockies and the Himalayas. Thus, outside of being neither black nor hills, the name fits them quite well. However, if they were called Nature's Playground or the Garden of Midas, or something like that, the name would fit better.



ALONG THE HIGHWAY THROUGH THE NEEDLES IN THE BLACK HILLS

The main reason for such statement is that the Black Hills form a region which is the richest spot of its size on earth, as far as mineral wealth is concerned, while its scenic ability, when you consider not only size, but variety and color, makes the average mountain landscape of this once broad and free land look foolish.



THE HIGHEST POINT BETWEEN THE ROCKIES AND THE HIMALAYAS

The United States Forest Service Fire Observatory on Harney Peak near the top of the world.

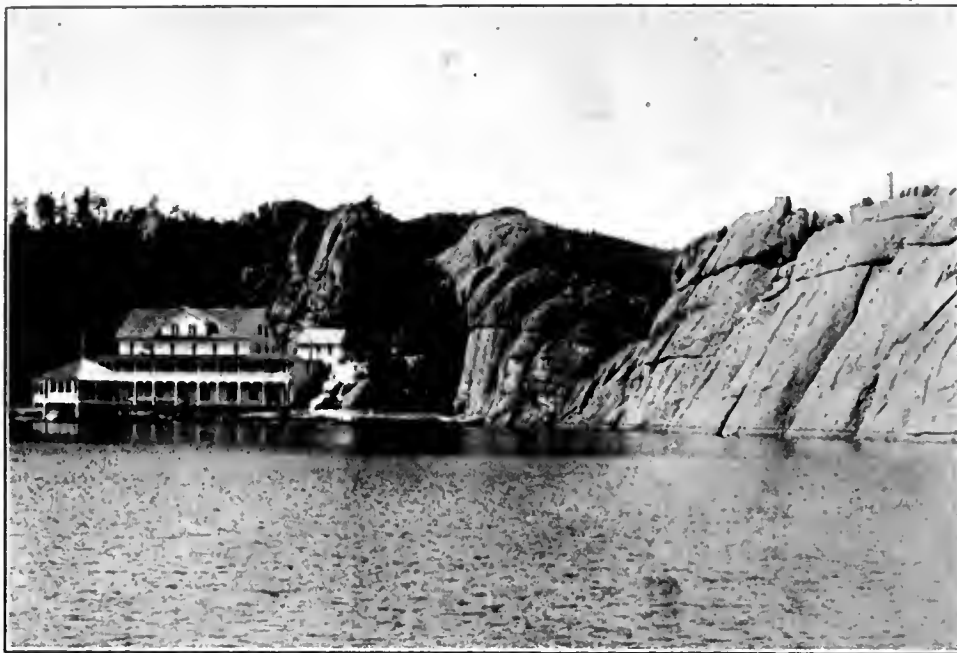
Harney Peak, named after General Harney, the Indian fighter. He discovered the peak in 1855 and climbed it with his staff officers. The party spent several days on the summit, during which time they planted a pole and flew the stars and stripes from this highest point in the United States east of the Rockies. Incidentally, they celebrated the event with a large

But I started to talk about hay-fever and how to discourage it, and I know of no other place where hay-fever has such a small chance as in these same Black Hills. I do not possess hay-fever, so am unable to say just what it is out here that is so rough on the ailment. It might be the wonderful air, and it is wonderful, besides which there is a great deal of it which has never been used up at all. Or it might be the scenery. There are some things the Hills do not have, but they do have scenery. You

can tell the world. For instance, there's

Harney Peak,

named after General Harney, the Indian fighter. He discovered the peak in 1855 and climbed it with his staff officers. The party spent several days on the summit, during which time they planted a pole and flew the stars and stripes from this highest point in the United States east of the Rockies. Incidentally, they celebrated the event with a large



SYLVAN LAKE, A VERY POPULAR SUMMER RESORT OF THE BLACK HILLS

and ribald champagne party, though such things doubtless should not be mentioned in these Volstead and pussyfoot times.

The Peak is nearly eight thousand feet above sea-level and commands a view of four states, approximating about forty thousand square miles of view. There are few places a person can go and see so much for the money. The Hills are now a national park under the jurisdiction of the United States Forest Service and an observatory is maintained on Harney Peak, where a guard is stationed who watches for forest fires and beautiful female tourists.

One of the interesting things in the Hills, to the average stranger, is the work of the Forest Service, which maintains several fire guards on the highest peaks, while scattered throughout the entire territory are ranger stations, where live the men of the forests who fight the conflagrations.

There is an average of about thirty fires a summer in the Hills, twenty per cent due to carelessness, the rest mostly caused by lightning. Since the Forest Service took over the Black Hills in 1906, it is estimated that several hundred thousand dollars worth of timber has been saved from destruction owing to preventative measures and prompt action.

Harney Peak, which is the central, highest and most important of the fire stations, is three miles from Sylvan Lake, the big summer resort of the Hills and one of the most beautiful spots God ever made, assisted by the State of South Dakota. Here is an ice-cold lake, clear as crystal, sixty feet deep, the shores largely of gigantic granite rocks and the whole perched up more than six-thousand feet above the sea. Also it is filled with delicious bass and trout, though I do not know how they got up that high.

At the lake is a large hotel, together with several cottages, cabins and camp grounds which take care of the thousands of tourists and

hay-fever hounds who visit the spot each year. A few months ago the State of South Dakota took charge of the resort and a great many improvements have been and are being made upon it. Those who have visited the Lake during the past few years will doubtless be pleased to know that when they come back this year the roof will not leak any more, besides which the dancing pavilion will be enlarged, there will be a pool hall, electric lights which light, plenty of running and jumping water, several new baths, a garage and all the modern conveniences, except mosquitoes.

The State and Forest Service also have built several new roads and repaired the old ones throughout the Hills so that it no longer is necessary to leave the



A BEAUTIFUL SCENE ALONG THE GRANITE SHORES OF SYLVAN LAKE



THAT MAJESTIC GROUP OF GRANITE SPIRES,
THE NEEDLES, BLACK HILLS

Henry in a ditch and walk four miles to get any place. From Sylvan Lake are trails to Harney Peak, the Needles and the Pools. The Pools are a series of beautiful granite basins set in the bottom of a deep, ragged canyon and surmounted by what is known as the Guardian, a huge boulder in the perfect shape of a man's bust. It is one of the curiosities of the country. The Needles is a group of slender spires, set around a flat oval a quarter of a mile in diameter. The spires rise to heights of six hundred feet, many standing alone, others in chains. Here may be seen enough freak-shaped rocks to last the average person a lifetime and their like is not duplicated anywhere in the country. Besides this, there is Hot Springs, the name being

self-explanatory. Here are more than a hundred mineral water springs which maintain a warm temperature throughout the year, so that the people living here are sure to have plenty of hot water if they have nothing else. The springs possess curative qualities good for a number of ailments and were highly prized and held sacred by the Indians until the whites discovered what was going on and then the Red Brother had to hunt up something else when he was sick. The springs are all boxed up now and it costs money to bathe in them, but the charge is low and the benefits and pleasure derived are well worth the investment.

A few miles from Hot Springs is another natural wonder, the same being Wind Cave. The air of the cave possesses qualities which give immediate relief to sufferers from colds, asthma and hay-fever. Even persons not bothered by such things should visit the cave, however. The cave is a government institution and guides are furnished to herd the visitors through the tunnels twice each day, the trips being at 9 A. M. and 2 P. M. on the dot, and no deviation from this schedule.

The cave consists of more than a hundred miles of long, narrow passages which at frequent intervals have branches leading off into chambers, but, of course, one need not go the entire route. The walls and ceilings are covered with elaborate crystal formations and among other things the cave contains one chamber, called the Fair Grounds, which is several acres in extent and is the largest natural underground room in the world. That is something to think over and remember.

So much for the cave. In passing, however, it might be well to remember that caves, several hundred feet underground, are likely to be damp and evening dress is not the best costume to wear on the trip. Hiking clothes are much more appropriate. No, I do not know where the wind comes from. There is a continual current



CEDAR PASS, BAD LANDS, SOUTH DAKOTA, WITH A REPLICIA OF THE
WOOLWORTH TOWER AT THE EXTREME RIGHT



THE JAGGED SIDE OF SPEARFISH CANYON IN THE BLACK HILLS

blowing from the cave, but its source has never been discovered. Some people claim it is due to reaction following the lectures of the guides, but I cannot say.

A few miles from Hot Springs are found the Cascade Falls, where seven mineral springs gush forth, one of these, known as the Big Geyser, gushing out sixty barrels of water per minute. This is an estimate, merely, not an exact measure, as the spring is not fitted with a water meter.

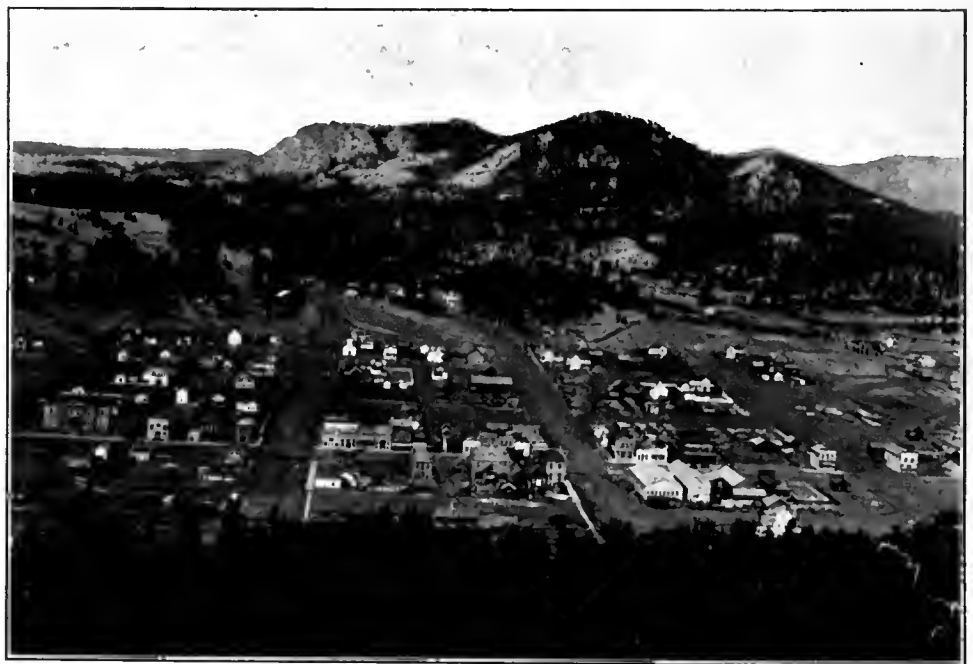
Other points of interest in the Hills include Bell Fourche, a town well stocked with early-day tragedy and history. It is now a flourishing city and the largest shipping point for range stock in the United States. Here is held an annual roundup, rodeo, stampede or whatever name you know these frontier sports by. It takes place July 5, 6 and 7.

Another annual roundup is held in Interior during August. Interior is a good place from which to see the Bad Lands, as it is in the heart of this formation and adjacent to many miles of rough view. Scenic also is a good point from which to tour the Bad Lands, and near here is the famous Sheep Mountain which displays some of the

most uproarious scenery to be found anywhere.

A few miles further west and all in a bunch is Sturgis, Bear Butte and Fort Meade, which, incidentally, is perhaps the finest military camp in the West. It was for years the most important frontier outpost and it was here the famous horse Commanche spent many years of his eventful life. Commanche, for the benefit of those who may not have met him personally, was the sole survivor of the Custer fight. He was found standing in a river two days after the battle and he was full of Indian bullets and indignation. He was taken carefully back to the fort, nursed to health and lived a decade or more thereafter. He was buried with military honors.

Thus we have peaks, lakes, springs, falls and caves in the Hills and about the only thing needed is a canyon. Well, there is a canyon. Spearfish Canyon it is called, and for real rough and reckless perpendicular scenery it is quite a ditch. Many people claim it is fully as good as the Grand Canyon, only on a smaller scale. People holding this view, of course, are not natives of Colorado and, as a matter of fact, seeing Spearfish Canyon would not really spoil a trip to the Grand, but as far as canyons are concerned the Spearfish is no slouch by any means. It



THE PEAK-RIMMED TOWN OF CUSTER, SOUTH DAKOTA, THE FIRST SETTLEMENT IN THE BLACK HILLS

may not be as big as some, but it certainly has the general idea and one of the finest trips in the Hills is the ride through this trench on the railroad which runs up its entire length.

The only drawback attached to the trip is that the sight-seer is not good for anything for two or three days after making the journey.

He is too busy rubbing cocoa butter on the roof of his mouth where it is all sun-burned, and changing the splints on his neck. That is the only trouble with Spearfish Canyon. The sides are both built too close to the railroad track. When there is several thousand dollars worth of scenery around a person and it is nine feet away and nine hundred straight up, it becomes quite a task to see it properly. It seems to me the

railroad could institute a novel idea and overcome this thing by running a string of flat cars fitted up with mattresses so the visitor could lay on his back and be in a natural position to look where the looking is at its best.

While in Spearfish the tourist also may see the government fish hatchery if his taste runs to such things. Of course it isn't much to see and the seeing would doubtless do one very little good, but it is there, and to people interested in that sort of thing it is quite interesting.

Rapid Canyon also is quite a groove if one is out looking for ruts. It was built near Rapid Creek and the creek got into it some way and couldn't get out. It did a good job of trying, however, and it doesn't run more than twenty steps without switching to one side or the other in an evident effort to climb the cliffs. Consequently, the road through the Rapid Ravine runs largely



KNIFE BLADE ROCK IN THE BLACK HILLS

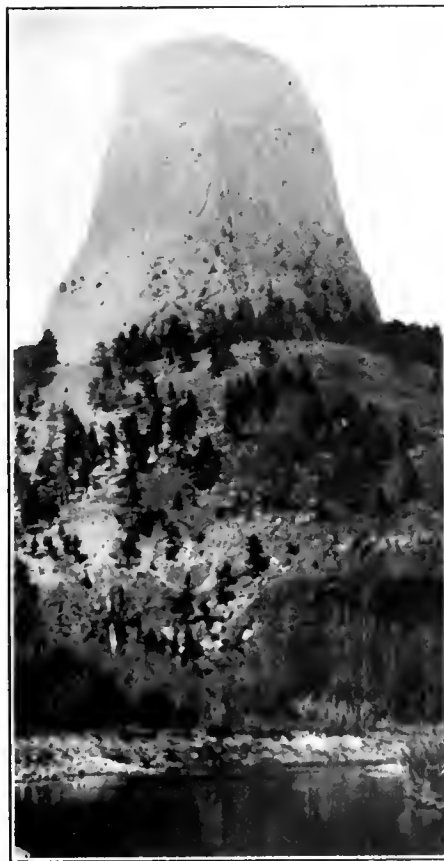
to bridges, there being scores of them in every mile of road which doubtless is the largest and most cumbersome number of bridges to the inch ever turned out, except by the Associated Order of Allied Dentists.

Then there is Crystal Cave and Jewel Cave, small but very select, and containing geological specimens as fine as any in the world, and there is the Wind Cave Game Park and the State Game Park, where may be seen deer, antelope, elk and buffalo.

Among the towns there are several of interest. Custer, the site of General Custer's headquarters in 1874, and the first town in the Black Hills, is famed as being the spot where the first gold was discovered in this region. A tablet marks the spot. Custer is the heart of the Hills and from here easy access may be had by rail and road to all the points of interest. It is six miles from Sylvan Lake and nine from Harney Peak. It is also near Wind and Jewel Caves, Hot Springs and the Needles.

Deadwood, the second, and most beautiful town of the Hills, is the point from which to see Roosevelt Mountain and Monument, the White Rocks, Spearfish Canyon, Bear Butte

and the Homestake Mine. In Deadwood are the graves of Wild Bill Hickok, Calamity Jane, Preacher Smith, Captain Seth Bullock and many other notables. Captain Bullock, first sheriff of the Hills, U. S. marshal, rough rider and a close friend of Roosevelt, was the man responsible for the dedication of Roosevelt Monument to the memory of our greatest American. (This, of course, is put in as a personal opinion. Democrats may differ.)



THE HUGE PILE KNOWN AS THE DEVIL'S TOWER.

Speaking of monuments, there is a natural one in the Hills which should not be overlooked. It can't be overlooked if one gets within a hundred miles of it, the same being Devil's Tower, which has been designated by the government as a national monument. The Tower is the only one of its kind in the world, being a great rectangular

obelisk of crystalized stone rising almost perpendicular to a height of 800 feet, one mile in circumference and composed of the largest crystals ever discovered.

The famous Homestake Mine is four miles from Deadwood and located in the city of Lead. The mine goes down a half mile or more, with shafts every hundred feet, comprising hundreds of miles of holeage. It is the largest gold mine in the world, which is another item to remember. The visitor is welcome to prowl all through the surface workings and see the process from beginning to end and the only restriction is that he is requested not to talk or make undue noise while visiting the stamp mill. The Homestake is owned largely by the Hearst estate, but outside of that it is a wonderful institution.

Then there is Rapid City, called by the inhabitants the Gateway to the Black Hills, though called some other things by different people. Rapid City was started by a group of men who came to the Hills after gold but had no luck. They did have foresight, however, and recognizing the spot as the logical trail to the Hills from the East, they decided to start a trading post at this point and thus gather in some of the wealth of the Hills without having to dig for it.

Many of the merchants of Rapid City today are evi-

dently equipped with that same foresight as displayed by the town's founders. Anyway, they saw me coming.

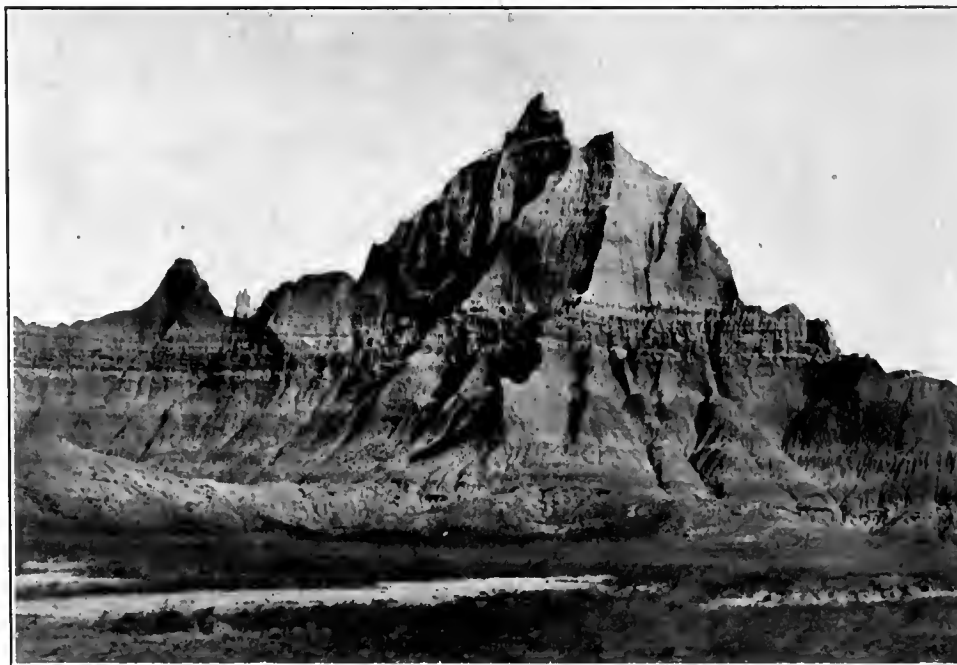
Of course, there are other ways of entering the Hills, but there are some interesting things in and near Rapid City which are worth while seeing and do not cost more than they should. Among these are the Indian School, the State School of Mines, Rapid Canyon and Hangman's Hill, where the pioneers were accustomed to drape cattle rustlers and horse thieves during the early days.

A few miles east of Rapid City are the world-famous Bad Lands, which are as wonderful as the Black Hills are beautiful. The Bad Lands, without a doubt, is the most God-forsaken-looking spot in the world, and yet they are so marvelous that it is impossible to describe them satisfactorily. Just to show how impossible they are of description, I will try it.

From ground covered with brush, thistles and cactus, there rise abruptly on every hand gigantic peaks, pinnacles and turrets of hard clay. The clay is streaked with layers of every color of the rainbow, but the general scheme is a dead grayish white and the formations are the most elaborate and grotesque to be found anywhere outside of Hell.

In fact, General Harney claimed the Bad Lands were "Hell with the fires out," but if he had been there on a good hot day in August he would probably have shortened his description by about four words, and if Dante could have seen them before he wrote his book he would have had a lot more local color to put into it. To me, the Bad Lands suggested nothing so much as the grave yard of the Universe. I never saw anything with such a long-dead appearance in my rather long and much misspent life. But there is no use trying to describe the Bad

Lands. They must be seen to be appreciated and some people, even after seeing them, can hardly believe it. There is one thing to remember concerning the Bad Lands. You may love the great outdoors and enjoy sitting in the lap of Nature, but do not try it in the Bad Lands. I got too close to Nature out there and I got up in some-



FITTINGLY NAMED—DEVIL'S CASTLE IN THE BAD LANDS OF SOUTH DAKOTA

what of a hurry with certain portions of my anatomy so full of cactus I looked like a porcupine. There are more varieties, shades and shapes of cactus in that region than there are hound dogs in Interior, which is quite some, and any time you sit down anywhere in the Bad Lands you get right up again and your entire day is spoiled.

As far as minerals are concerned the Black Hills has all of them. There is no known mineral not found in the Hills. Of course, only a few are in quantities sufficient to be payable as mining propositions, but they all are there, together with representatives of every known gem, except the pearl, and if oysters could climb mountains there doubtless would be pearls also, thus making it unanimous.

Among game the Hills contain deer, elk, wolves, coy-

otes, beaver, fox, tourists, wild-cats, grouse, jack-rabbits, ducks, geese, burros and numerous other varieties, besides which bass and trout are plentiful in all of the streams.

For those who like flowers, the Black Hills modestly



THIS IS A TYPICAL RANGER STATION IN THE BLACK HILLS FOREST RESERVE

offer more than nine hundred different kinds. One spot, near Custer, was given the name Floral Valley by General Custer and a prominent botanist later declared that this valley contained a larger variety of wild flora than any other single spot in the world.

As to roadways, most of the best-known routes to the West go through or near the Hills, besides which there is the Chicago, Northwestern, the Chicago, Burlington & Quincy and the Chicago, Milwaukee and St. Paul rail lines.

The automobile roads include the Black and Yellow Trail from Chicago, via Rapid City, Lead and Deadwood to the Yellowstone Park through the Cody entrance; the Scenic, on the George Washington National Highway from Savannah, Georgia, via Sioux Falls through the Bad

THE famous cedars of Lebanon were almost wholly destroyed during the World War, according to a writer in a San Francisco periodical. The trees date back to the earliest times. They were historic during the wars of Sennacherib, 608 years before Christ, as described in the psalms of David. Pliny, the Roman historian, claimed their wood to be everlastingly durable, and the Arabs believed the trees to exist for all time. Timbers unearthed in the ruins of ancient Assyria

Lands, after which it joins the Black and Yellow Trail; The American, from Lead and Deadwood to Miles City, Montana, the Loup River Shore Line from Omaha via Fremont, Nebraska, Long Pine and Rapid City to Lead and Deadwood; the Denver Highway, through Hot Springs, Sylvan Lake and other points in the Central Hills. This is perhaps the most picturesque route of all, as it strikes the best part of the Hills and continues up to Deadwood and Lead, Sturgis, Fort Meade, Government Irrigation Dam and Spearfish Canyon.

There are good hotel and garage accommodations throughout the Hills, besides which the Forest Service has established public camp grounds all along the highways. These grounds are fitted with stoves, water and wood, while almost every town has a Commercial Club where tents and equipment may be rented.

The climate in the Hills is wonderfully mild and even,

NIGHT IN THE BLACK HILLS

BY EARL H. EMMONS

The moon rides high in an azure sky
O'er the mountains high and still;
Its slender beams with their silver gleams
Touch the valley, stream and hill.

At timber line stands the stately pine,
Like sentinels of the night;
The shadows creep over gulch and steep
In the ghostly, paling light.

Each lofty peak in the moonlight streak
Is bathed with the rainbow's tones
From the sparkling dots of mica spots
Like a million precious stones.

From a far-off vale comes a coyote wail,
With its weird, falsetto trills;
A fragrant breeze fans the rustling trees—
It's night in the Great Black Hills.

with little wind. There are few insects and no poisonous snakes. The open season for tourists runs from May to November.

How's that?—mountains, lakes, hot and cold springs, caves, canyons, mines, birds, fish, game, flowers, towns and items of historic interest—all gathered into a compact bundle easy to handle. Can you beat it? You can not. If you haven't seen the Hills you certainly should and if you have, then you will again and there's that.

have been found practically unchanged after 2000 years and more. In olden times the oil from the trees was used as a cure for leprosy, and it was used by the Romans to preserve their manuscripts. Individual trees were often 42 feet in circumference and 90 feet in height, with a wonderfully beautiful spread of branches.

During the late war the Turks cut them down for fuel for locomotives and then the opposing forces continued their destruction for fuel and other military purposes.

FOREST WASTE AND FIRE LOSS

BY ARTHUR NEWTON PACK

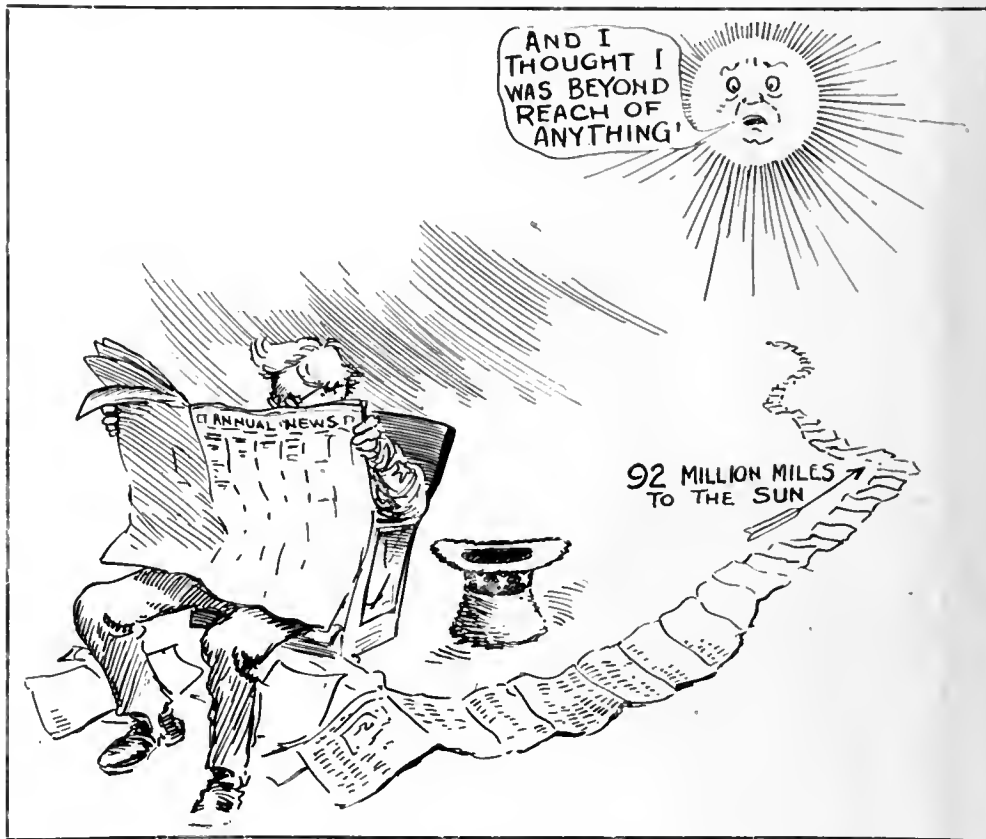
DID you ever stop to consider what a part the old family wastebasket plays in the depletion of our forests? It may not be the cause, but it certainly represents the end for between one and two million trees every year. Except for library and editorial files nearly every copy of some twenty-five hundred different daily papers and fourteen thousand other periodicals published in the United States finds its way sooner or later to the wastebasket. The amount is almost inconceivable.

Our annual consumption of two million tons of newsprint a year means a strip of paper as wide as the New York Times and about forty million miles long. Just as a measure of distance, remember that the sun is ninety-two million miles away. It would also make a two-foot wide ribbon of newspaper around the world 1600 times.

"I could get along without half of my daily newspaper anyhow," says the reader.

"Look at those advertisements—pages of them!" Very true; but the trouble is that the newspaper and

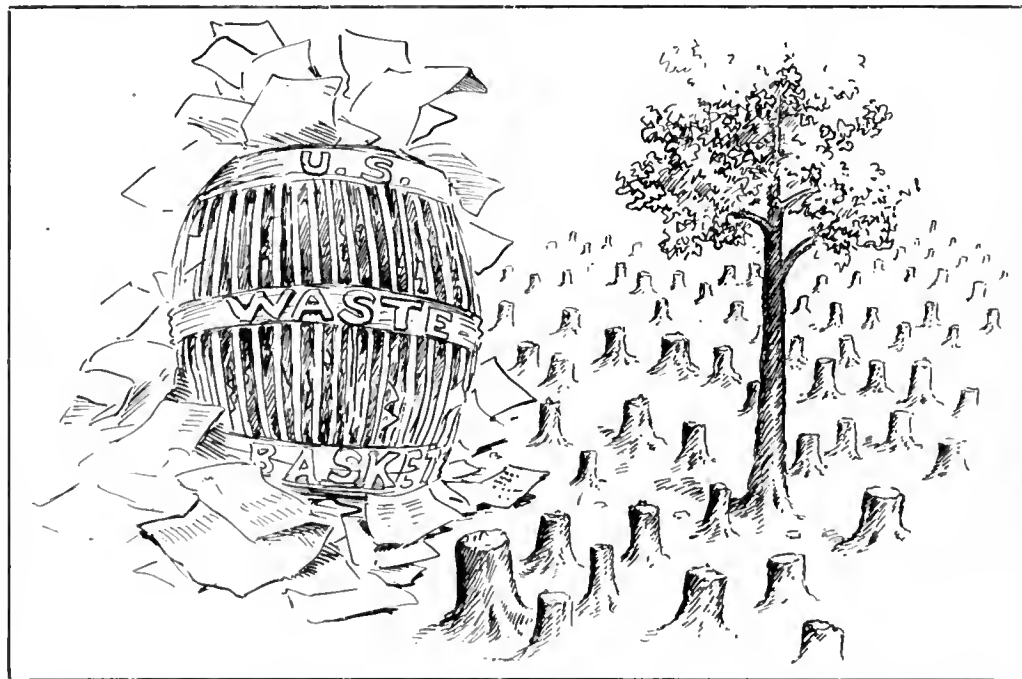
periodical managers could not give us the reading matter and stories that we like without those advertisements.



OUR ANNUAL CONSUMPTION OF NEWSPRINT IS EQUIVALENT TO A TWO-FOOT STRIP OF PAPER FORTY MILLION MILES LONG

A large metropolitan daily weighs in the neighborhood of four ounces: A Sunday paper may weigh a couple of

pounds. Of course, part of that weight is printer's ink; but we can probably offset that against the paper lost through waste in the printing, over-run of copies, etc. Except on Sunday you pay three cents for your copy. At the commercial rate of five cents a pound for the paper alone, where do the editors, the reporters, the printers and the owners come in? Why, through the advertising profits. Any man who has ever tried getting his advertisement printed knows what it costs. For a double spread in a single issue of the Saturday Evening Post, for instance, the ad-



EVERY DAY NEARLY FIVE THOUSAND GOOD-SIZED TREES FIND THEIR WAY BACK INTO OUR EVER-OPEN WASTEBASKETS

CHICAGO
 vertiser is willing to pay \$10,000.

Just so long as every additional sheet pays it will remain a permanent part of any publication.

In Australia and New Zealand the wholesale use of paper is not so lightly regarded. At a recent pulp and paper conference in Canada a New Zealand delegate waved aloft a copy of a New York daily paper. "This paper contains thirty pages," he shouted. "If I dared to print thirty pages in one day in my paper, I would be sent to jail." Doubtless this same delegate must have seen one of our hundred and sixty page Sunday editions, and we wonder what the effect was. The time is coming, here in this country.

not be difficult. It is estimated that about three million cords of wood per year are manufactured into paper for magazines and newspapers. At ten cords per acre this would mean three hundred thousand acres.

Supposing that it takes about forty to fifty years to grow good pulpwood spruce, and allowing for possible

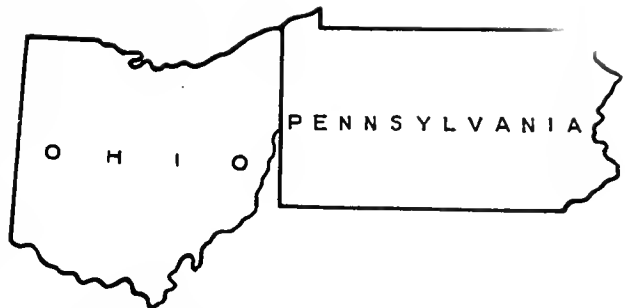
loss by fire, wind, blight or failure of seeding, a tract of thirty thousand square miles planted with forty successive crops of timber, each crop coming to maturity at one year intervals, would under proper care and management, furnish a perpetual supply of pulpwood for newsprint. This means an area a little smaller than the state of Ohio, but represents less than one-tenth of the area of our cut-over lands, most of which are now almost entirely unproductive.

There is no question but that a perpetual supply of pulpwood for all needs is a possible and practical scheme. It will not, however, come merely for the asking.

There must be, first, a proper national forestry law with adequate provisions for fire protection and government reforestation on a scale large enough to demonstrate the economic soundness of the idea; second,

every state must adopt thorough-going forestry principles with provisions to protect growing timber from exorbitant taxation; and, finally, with these laws

as a basis, the pulp and paper industry, together with all other wood using industries, must be made to see that in practical reforestation and conservation lies their only salvation. To accomplish these three things will require the united efforts of every man and woman. We should not leave to any group of foresters and legislators the sole initiative in solving such an important economic problem; but, by the continued expression of our thought and conviction, we can urge those groups to supply our imminent need. This can not be brought



AREA OF FOREST FIRES FOR FIVE YEARS
 The forest fires in the United States in the past five years burned over 56,488,000 acres, an area greater than that included in the States of Pennsylvania and Ohio.

AMOUNT OF TIMBER DESTROYED YEARLY BY FOREST FIRES

A five-room frame house could be erected on both sides of a road from New York to Chicago, at distances of 100 feet apart, with the amount of lumber destroyed every year by the forest fires in the United States.



NEW YORK

when the economic law of necessity, a law far stronger than any enforced by a mere jail penalty, will bring our own publications to some sort of retrenchment.

Authorities agree that that time is not far distant. Already more than one-third of our pulpwood comes from across the Canadian border, and Canada, profiting by our mistakes, is now taking steps to forbid the cutting of timber at a rate more rapid than its growth. That means primarily that our annual importation of Canadian pulpwood has practically reached the maximum, and for the other two-thirds at least we will have to look after ourselves.

If we once squarely face the facts, the solution of the problem will



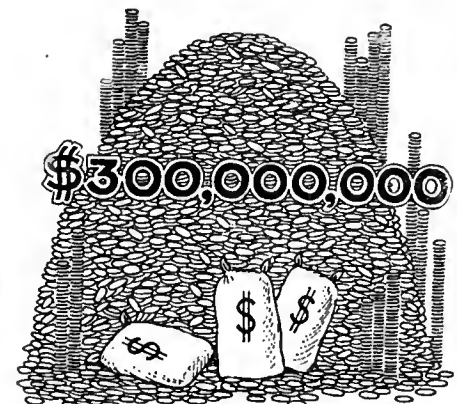
FIVE YEARS' FOREST FIRE LOSSES

This represents the value of timber and property destroyed in the last five years by forest fires, most of which could have been prevented by adequate fire protection work.



BUSINESS LOSES THIS SUM YEARLY BY DESTRUCTION OF LUMBER

If loss by forest fires is stopped the business interests concerned in building construction will make profits of \$400,000,000 a year, the material saved put into houses.



BANKERS AND REAL ESTATE MEN LOSE THIS YEARLY

Profits of \$300,000,000 through the sale of lands and loans on houses are lost every year by the destruction of timber in the forest fires which rage from one end of the country to the other.

about by silence or a non-committal attitude. Our expression must be definite and emphatic.

The United States Forest Service is authority for the statement that forest fires annually destroy two billion feet of timber, or material enough to build a five-room frame house every one hundred feet on both sides of a road extending from New York to Chicago. With four people to a house, these 100,000 or more buildings would provide a home for nearly one-fourth our yearly increase in population—a number sufficient to populate a new city each year the size of Cincinnati, New Orleans, Minneapolis, Kansas City, Missouri, or Seattle. More than 160,000 forest fires have occurred in the United States during the past five years, 80 per cent of which were due to human agencies and therefore preventable. These conflagrations burned over 56,488,000 acres—an area greater than that included within the States of Ohio and Pennsylvania—and destroyed \$85,700,000

worth of timber and property. If this needless waste were stopped and the material thus saved put into houses, the various business interests concerned in building construction, such as lumber dealers, carpenters, masons, and supply houses, would, it is estimated, benefit to the extent of more than \$400,000,000 annually. Bankers and real estate dealers would also profit through the sale of lands and by loans on homes to the extent of an additional \$300,000,000. Forest fires are therefore of vital concern to not only the everyday citizens, but to every business man and laborer.

Forest protection goes hand in hand with national prosperity. Next to food and clothing, wood is the most indispensable product of nature. Without wood there can be no agriculture, no manufacture, no commerce. Forest fires destroy life and property, impoverish the soil, drive away animal life, cause floods and drought, and make waste the playgrounds of the people.

EXPERIMENT STATION OPENED AT ASHEVILLE

A new forest experiment station, the first in the Eastern States, has just been established at Asheville, N. C., by the Forest Service of the United States Department of Agriculture. Steady depletion of the Southern Appalachian timber supply has been responsible for the location of this station in the East, and the object of the work to be conducted will be to secure the information needed by foresters to determine the best methods of handling forest lands in the southern mountains.

For many years the United States has depended for a large part of its hardwood timber products on North Carolina, Virginia, West Virginia, Kentucky, Tennessee, Alabama, Georgia and South Carolina, states the Forest Service. The crest of hardwood production in this region, with a cut of approximately 4 billion feet, was reached in 1909. In 1918 the production had fallen off nearly 60 per cent in the face of rising lumber prices and increasing demands. There is every reason to expect the same trend to continue, owing to the steady decrease in timber supplies. This involves one of our most important hardwood forest regions and many important dependent wood-using industries, including railroads.

The country as a whole will, in the future, have to depend on the steep mountain slopes of the Southern Appalachians for a very large percentage of its high grade hardwood supplies. The bulk of the remaining hardwood stands is now in the Lower Mississippi Valley, and it is practically certain that a large part of this rich bottom land will be used for agricultural purposes, when the timber is removed. The entire country should, therefore, be directly interested in bringing about the growing of hardwood timber in this region, where ideal conditions exist for its production.

The general timber situation in the United States is exceedingly serious, foresters say. Something like three-fifths of our original timber stand has been destroyed or utilized, and an appreciable percentage of the remain-

ing two-fifths is made up of inferior second-growth. One-half of the timber we have left is in the three Pacific Coast States—Washington, Oregon, and California—while 90 per cent of our timber markets lie east of the Rockies, and a very large part of that 90 per cent east of the Mississippi River. Excessive prices for lumber, pulp paper, and practically all wood products have resulted from this situation.

The Appalachian forest experiment station will have to deal with the problems of a forest area approximately equal to twice that of prewar Germany. It will have to cover the problems of a large number of valuable species of trees, including 10 or more oaks, several hickories, which have, so far as is known, no foreign equivalents, yellow poplar, basswood, black walnut, cherry, specialty woods of high value, several valuable ashes, chestnut, and a number of other hardwoods. White pine and spruce and some southern pines are also well represented in this region.

Special problems under consideration are: The conversion of extensive cut-over, fire-damaged, and relatively unproductive forests into rapidly growing forests of the best species; methods for replacing the blighted chestnut forests; fire protection; the relation of grazing to forest growth and reproduction; methods of management which will produce the greatest protection to municipal watersheds; the greatest regulation of stream flow; the prevention of erosion. Studies in the quantity of timber of different species that can be successfully grown, and the development of methods for artificial reforestation will be part of the work. The whole technical basis for the practice of forestry for the region will be covered, in addition to the problems of National Forest administration. Success in reforestation, timber growing, and protection will depend largely upon the technical knowledge obtainable by means of the newly established forest experiment station.

FOREST RECREATION DEPARTMENT

ARTHUR H. CARHART, EDITOR

HELENA NATIONAL FOREST—A MOTORIST'S PLAYGROUND

BY A. H. ABBOTT, FOREST SUPERVISOR

MONTANA, the land of shining mountains, offers to the jaded citizen looking for restful vacation advantages unusual. Known and advertised for its mineral deposits, its livestock industry and farming opportunities and its magnificent stands of timber, the Treasure State offers also a wide range of lofty snow-capped peaks, waterfalls, tree-fringed lakes and trout-filled streams. These make up a vacation country of unusual charm and delights.

Many of these beauty spots are practically inaccessible except to the seasoned camper who can stand the vigorous exercise necessary to cover long trips on horseback. But there are people who for many reasons are unable to stand the rigors of such a trip, and these seek places where motor or carriage can take them

in greater comfort and ease. All National Forests offer the chance to rough it, but there are a few which present to the visitor scenic values equal to others which can be also traveled in auto or buckboard. Such a Forest is the

Helena National Forest, with headquarters at Helena, Montana. No more romantic land can be found if one is inclined to seek those places where history has been made. Every gulch, every town and each stream have tales to tell of the golden days of early mining activities. Many are old ghost cities now, but around the stark skeletons of mills and cabins hangs a glamor equal to the cloak of romance worn so readily and gracefully by the scenic

settlements of the Old World. Helena, the capital city of Montana, is built in Last Chance Gulch. This name

Many of the playgrounds of America have been well known to the public for many years. The form of Old Faithful spouting in steamy grandeur at once suggests to all the great recreation grounds within the Yellowstone National Park. Many other cases could be cited where the scenic features of these areas are as well known to all. But one showing a picture of the Gate of the Mountains in the Helena National Forest would have to explain where and what it is. There are many little advertised but wonderfully beautiful scenic features in our National Forests and in them are many recreation fields of unbeatable offerings to the vacationist. It is somewhat with the same pleasure that you present a newly found friend to an old acquaintance that this department asks you to meet the Helena National Forest. It is deserving of your friendship and paying it a visit will prove this. Make this article your introduction to this Forest and an invitation to come and get personally acquainted with it.



GATE OF THE MOUNTAINS

Lewis and Clark paused here in their expedition of exploration to the northwest. Here the river cuts directly through the Big Belt mountains flowing through a canyon with sides of jagged rock partially cloaked with greenery of fir and spruce.

snacks of the olden days when prairie schooner bumped through rugged passes to reach the treasure of the western mountains. Many a pioneer had a last chance gulch, but this last chance proved to be a good one, and the early



BEAVER DAM

Under State protection these animals have increased from a point where they were almost extinct to where one traveling the high-ways of the Forest may often see their work.

working of the mines located here produced considerably more than \$50,000,000 in gold. Now an auto road winds where before pack train and heavy wagon toiled to bring out the metal found in this canyon, and one of the most popular drives to be found in the section is through this famous mining location.

Confederate Gulch, another famous placer ground, heads in the Helena National Forest. There stands what is left of Diamond City, once the county seat of Meagher County, and a thriving town of several thousand people. Now, the miners have gone, most of the buildings are torn down, the Forest is gradually covering the great piles of earth and rock left from the placer washings, and the last resident, a Chinaman, China George, lives in his shack with only a cat for company, and dreams of the busy days of the past. These were indeed busy days, for during the mining here Confederate Gulch added to the gold supply of the world bullion worth from \$70,000,000 to \$100,000,000.

But these reminiscences of the gold rush days are not the only attractions which have a historical setting in the Helena Forest. Lewis and Clark paused here in their

expedition of exploration to the Northwest. Standing today in all of the scenic beauty which caused these pioneer adventurers to give it so fitting a name, the Gate of the Mountains will prove to be one of the unusual attractions of the Helena. It is along the Missouri River, which has just reached lusty young riverhood at this point, and it is in the northwest corner of the Big Belt Division of the Forest. Here the river cuts directly through the Big Belt Mountains, flowing through a canyon with sides of jagged rock partially cloaked with the greenery of fir and spruce. The part of this canyon which constitutes the Gate of the Mountains furnishes one of the few water trips available in all Montana. The canyon is over twenty miles long, with walls rising over three thousand feet above water line. The entire trip to the Gate must be made by water and is a trip worth going miles to enjoy.

Following the McClellan road south from Helena one will soon reach the Forest. This is a good mountain road and for several miles its traverses pleasing picnic spots



LOCAL PEOPLE USE THE HELENA FOR PLAY
Fall, winter, spring and summer, the hardy Boy Scouts hike in the hills of the Helena. Signaling on a winter hike.

and camping places. Beyond the end of the road one reaches a country where foot trips and horseback travel must be resorted to. The road is typical of many in this Forest, taking one into the heart of the Forest as it does, and there allowing them to stop and explore the scenic features in a more leisurely fashion. Along the principal roads of the Forest and back where only pack horse can well travel are many open parks with nodding flowers and trees standing as stately guards around the borders. These are ideal locations for a camp or for a big community picnic. Along the road over Priest's Pass are many such places and



McCLELLAN ROAD

Following the road south from Helena, one will soon reach the forest. This is a good mountain road and for several miles it traverses pleasing picnic spots and camping places.

one right at the top of the pass and on the road was used by the citizens of Lewis and Clark County and their neighbors from Powell County for a picnic to celebrate the completion of another scenic highway in this National Foreground, the Priest's Pass Highway. In these forest parks one may camp for a night or a week or more, with only the rules of the forest governing when on Forest land. These are necessary to keep the camps fit places for all comers, and they are: "Keep your camp clean and leave it clean"; "bury or burn all refuse and tin cans"; and "as you value your life and property be



BEAVER CANYON

It is located in the Big Belt mountains and is near the Gate of the Mountains. The whole district is in a limestone area and wind and water have done master carving on these walls.



PRIEST'S PASS PARK

These are ideal locations for a camp or for a big community picnic. Many such parks can be found in this popular National Forest and they are freely used by the people of the vicinity.

careful with fire." Although most people do not stop to think of it there is no small penalty attached to violating these rules and if you are not careful your vacation may end in being invited before some court by a watchful ranger. This is true of all National Forests and of course applies to the Helena.

Many canyons of this Forest offer spectacular walls to view. The whole district is in a limestone area and wind and water have done master carving on these walls. Minaretted spires stand from the side and pinnacles with softest of colorings rise from abutments which reach

into the valley floors, so that these spires and walls take on the splendor of the facades and towers of some magic city of the Orient.

Beaver Canyon is a splendid example of this nature carving of limestone cliffs. It is located in the Big Belt Mountains in the region of the Gate of the Mountains. A good road leads into this picturesque cleft in the hills and it is one of the favorite places where the people from Helena and other Montana towns go for a picnic on pleasant summer days.

There is a local appreciation of these play areas in



DIAMOND CITY

Once the county seat of Meagher County and a thriving town of several thousand people. Now, the last resident, a Chinaman

the Helena National Forest. Many of the residents of nearby towns take advantage of the chance to play in National Forest territory. The Y. M. C. A. has a camp in the Forest every summer and in the fall, winter, spring and summer the hardy Boy Scouts hike in the hills of the Helena.

Animal life is not wanting in this play land. All the usual wild residents of the hills are here from the more timid dwellers of the tree top and shrubby thickets to the larger game animals. Under the protection of the State the beaver have multiplied and have increased from a point where they were nearly extinct to where one traveling over a road which parallels a stream may often see their engineering feat of creating a lake for their own special benefit.

For the autoist traveling in the West the Helena National Forest is one place to be sought. Many National Forests offer a multitude of interesting features and pleasing places in which to camp or explore, but few offer the roads for the auto driver which one can find in the Helena. Then here, too, is the unusual trip which can be taken in a mountainous country through the canyon of the Missouri to the Gate of the Mountains, a bit of mountain scenery equal to many which are far more widely known, but no more unusual or interesting.

So wherever you travel in the West, whether it be in an auto with all the luxurious fittings of a parlor car, or if you drive a sputtering little four cylinder bundle of metal made active by the urge of gasoline exploding under a cracker box hood, make one of the objectives of your trip the Helena National Forest. And because it is impossible to here give more than a few representative things which you will find in this Scenic Forest you are invited to this place to find for yourself all of those unsung features which can be found here. The Supervisor's office is in Helena, and as you are bound to reach that point before you travel far in the Forest, you can there find information in full of the auto roads and scenic features of the playground for the motorist in the mountain lands of the Helena.

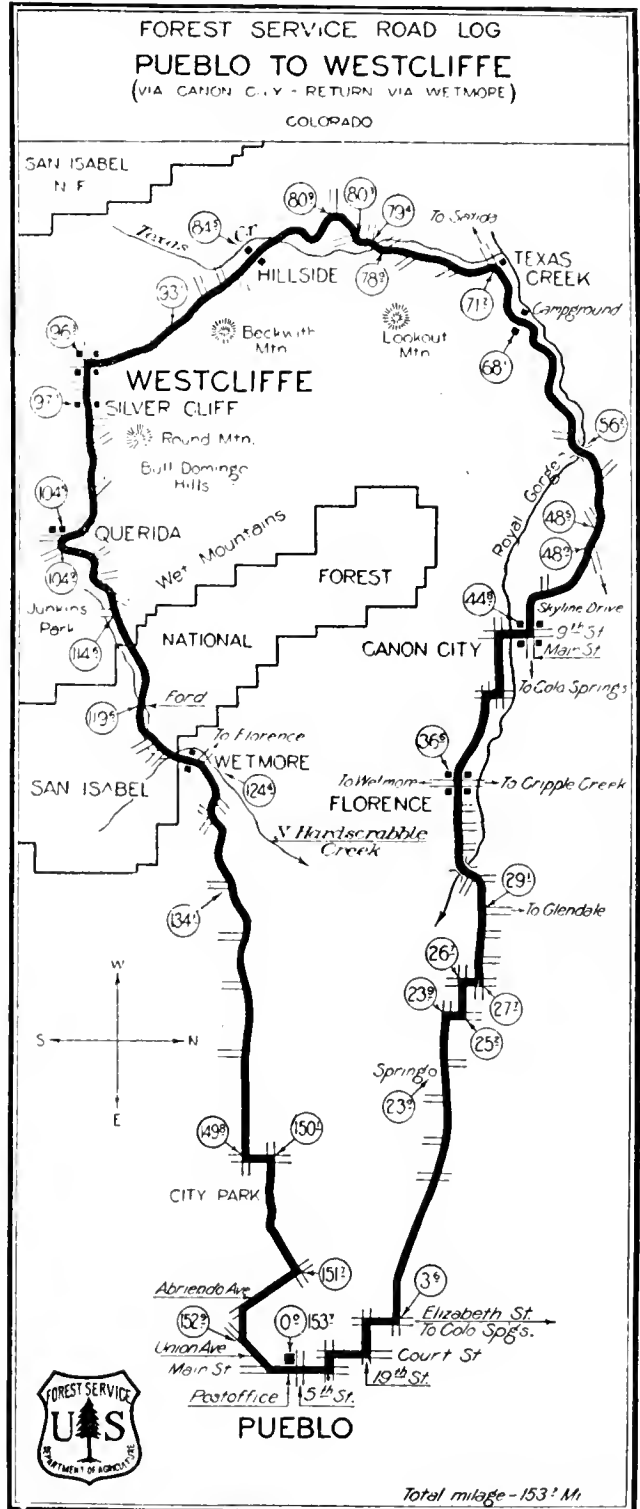
FOREST ROAD LOGS IN COLORADO

The illustration shows a typical road log of a new series that is being prepared by the U. S. Forest service, cooperating with local commercial organizations. Practically every road in mountainous country of Colorado either passes through or near National Forest territory. It is probable that eventually every road so situated will be logged and cards printed similar to the cut shown. Armed with a sheaf of cards the tourist will be able to explore the mountains from end to end for one card fits to another to give the log of a trip of many miles or serves as a single trip log. These may be secured from the local commerce clubs of towns in and near the mountains of Colorado.

THE WOODBURY WEeping ELM

A few miles out of Union City, Indiana, stands a noble old tree of the weeping elm variety, or as botanists would say—water elm.

The great tree is isolated from others of its kind, and for this reason is a conspicuous landmark. It has a place in all the guide books that are compiled for the benefit of travelers. The height of the tree is much over 100 feet; the trunk, 4 feet in diameter; the spread of the graceful, drooping branches, 100 feet; the age, estimated to be near 200 years. The first owner of the farm was Nathan Woodbury.—V. M. Overman.



WE FAIL TO USE FOREST-GROWING LAND

REFORESTATION has not been taken seriously by the average business man in the United States," said Col. W. B. Greeley, chief of the Forest Service, United States Department of Agriculture, before the National Association of Wood Turners recently. "Reforestation has been looked upon as a fad quite removed from the practical interests of the manufacturer, as something more concerned with parks or shade trees or rose bushes.

"Chicago is the greatest lumber market in the world. Since 1890 an average of over 2,000,000,000 feet of lumber has come into Chicago every year. In 1920 the figure was nearly 2,500,000,000 feet, 60 per cent of which went into local construction and manufacturing industries. In 1900 the average freight paid on lumber coming into Chicago was less than \$3 per M feet. Since that time the local sources of supply for this territory have been exhausted one after another. Lumber shipments have traversed greater and greater distances, and the average freight bill paid by the Chicago distributor has steadily risen to more than \$12 per M feet.

"In other words, the increased transportation charge on lumber shipments into Chicago, as a result of the exhaustion of the forest regions surrounding it, represents a toll of \$22,500,000 annually. And while this has happened there have accumulated in the Central and Lake States nearly 23,000,000 acres of logged-off forest land which is producing neither farm crops nor timber; \$22,500,000 is the yearly tax which the wood-using industries and home builders, supplied through Chicago, pay for the idleness of a large part of the soil in the surrounding States which should furnish the natural supply for this district. This sum would plant every year 1,500,000 acres of land with forest trees.

"This illustration may be extended to cover the four States of Illinois, Indiana, Wisconsin and Michigan. These States consume annually between 4,000,000,000 and 5,000,000,000 feet of timber in furniture factories, sash and door mills, factories manufacturing agricultural implements, wood-turning establishments, and other wood-using industries. Sawmills are excluded from this estimate, also the requirements for general construction and housing, and the consumption of lumber on farms. The manufacturers referred to represent an invested capital of \$760,000,000 and enroll 260,000 skilled employees. This great manufacturing industry was built up on the softwood forest of the Lake States and the hardwood forests of the Ohio and upper Mississippi valleys, whose products were available at a low transportation cost. In these four States enough forest land to supply in full the needs of these industries now stands idle.

"We are cutting our timber probably four times as fast as timber is being grown." It is useless to decry the generous use which American industry has made of our forests. It has contributed powerfully to the industrial development and commercial supremacy of the United States. The forestry problem does not result from the liberal use of our forests, but from our failure to use our forest-growing land. There is an ample area of land in this country, which is not tillable, to support all of our timber requirements, all of our wood manufactures, all of our home building and agricultural use of lumber, indeed an even larger export trade than at present, if that land can be kept at work growing timber. Reforestation has become a commercial necessity of the United States."

STATES AIDED IN FOREST PROTECTION

Twenty-four States, or more, will receive \$400,000 of Federal funds for the protection of their forest lands from fires during the fiscal year beginning July 1, according to statements by the Forest Service of the United States Department of Agriculture. This co-operation was first authorized by the Act of March 1, 1911, commonly known as the "Weeks Law," and has continued ever since. Last year \$125,000 was appropriated for the work, but Congress this year, realizing the importance of fire prevention in our forests, substantially increased the amount to be expended. At least three more States are expected to join the ranks of co-operators shortly.

Allotments of money for forest protection are made by the Forest Service to individual States on the basis of 7 per cent of the estimated cost of adequate fire protection in that particular State, with the limitation that the maximum allotment cannot exceed \$25,000. Both figures depend upon, and vary with, the size of the Federal appropriation for this work received from year to year. Forestry experts believe that the ideal apportion-

ment of protection expense would be: Federal Government 25 per cent; States 25 per cent; private owners 50 per cent, but this is not possible at present.

The four important limitations governing Federal co-operation in fire protection under the Weeks Law are:

- (1) It is extended only to States that have provided by law for a comprehensive system of fire protection.
- (2) It is limited to the watersheds of navigable streams.
- (3) The State must expend an amount at least equal to the Federal appropriations for that State.
- (4) Fire protection must include not only merchantable timber, but also young growth and cut-over lands; in other words, it must cover all classes of forest land.

The basis of this Federal co-operation is the recognition by the Government of the Nation's interest in keeping the forest lands of our country continuously productive, especially on the watersheds of navigable streams and the further recognition of the fact that the Nation should bear a part of cost of the work.

FIGHTING THE JAPANESE BEETLE

BY C. H. THOMAS

AT Riverton, New Jersey, an entomological laboratory has been established, with a corps of thirty or more men, mostly college students, from the various state universities, and elsewhere, whose purpose is the study and control, under efficient government supervision, of the Japanese beetle. This destructive beetle has been found in large numbers in Burlington and Camden Counties, where it attacks the flowers, shrubs, nursery stock, vegetables, corn and a great variety of marketable produce. That the beetle is a real menace to other sections of the country has been proven by its ravages in the territory where it is now confined, and every effort is being made by the men who are studying its life habits to control the troublesome pest. The beetle attacks the foliage and injures by skeletonizing the leaves, also by attacking flowers and actually eating fruit on the trees.

The Japanese beetle is a beautiful insect about the size of the potato beetle, but flattened. The head and thorax are shining bronze green and the elytra or wing covers are brownish tinged with green to the edges. On the sides and at the tip of the abdomen, usually not concealed by the wing covers, are conspicuous white spots, which distinguish the species from all others of the same size and habits occurring in New Jersey. It was first discovered in 1916, having been brought from Japan, apparently. In some parts 20,000 of these beetles have been collected in a single day. The spread of the insect is over an acreage of about 5,000 acres of the finest kind of soil.

The fight against the beetle is being waged by using all sorts of preventive measures, including the use of arsenate in solution as a spray. From June 15th to November 1st the Federal and State plant quarantine laws require farm, garden and orchard products, plants and flowers, grain and forage crops of all kinds, and soil from the infested area to be certified as free from the Japanese beetle before shipment is permitted. Farms within the quarantined area, but outside the known infested territory, are granted certificates permitting shipments until beetles are found

and the permit revoked. The men are assigned each day to certain farms, where they officially inspect all produce to be sent to the markets, and a certificate is not issued until the stuff is known to be as nearly free from the beetles as is humanly possible to determine by a careful inspection. The beetle lives in the ground a great deal of the time, coming up and finding refuge along the roadsides, whence it may be carried in a passing vehicle or on personal clothing to a point outside the infested area, which more than likely explains the way it got over into Pennsylvania, where it is at present causing considerable alarm, although scouts are now working vigorously to

offset the pest in its new habitat. The State Department of Agriculture is opening a field headquarters in Holmesburg, Pennsylvania, from which it will direct the fight against the Japanese beetle. The beetle invaded Pennsylvania late in the fall from the New Jersey side. A quarantine had been imposed by the department upon agricultural products in the infested area, which takes in the small strip of farming country in Philadelphia county and part of Bensalem township, Bucks county. Details of the proposed fight to eradicate the pest from Pennsylvania were formulated at a conference held in Philadelphia by Prof. J. G. Sanders, head of the Bureau of Plant Industry, State Department of Agriculture, and C. H. Hadley, of the federal Department of Ag-



JAPANESE BEETLES DESTROYING PEACHES

Though the beetle seems to prefer a diet of developing roots and compost of all kinds, it is as well a voracious feeder on the choicest fruit, as shown in the photograph.

riculture. A representative of the Pennsylvania Department will be in charge of the field station, and a set of maps will be made showing the location of each tract of land in the infested area. Federal inspectors will be appointed as deputies of the Pennsylvania Department so as to facilitate the examination of intrastate shipments from the quarantined district as well as interstate shipments. The Japanese beetle is a strong flier and capable of dispersing itself over considerable distances, but the greatest danger lies in the ease with which it may be carried in vehicles or on clothing. To offset this the shrubbery is burned close to the road and a good ways

back, so that the beetle is confined to the ground and can be thus taken care of better in the ground by spraying with poison.

The beetle larvae seems to prefer a diet of decomposing roots and compost of all kinds. They have, however, been observed feeding on the roots of dock, plaitain, timothy, bluegrass, corn, rye, wheat, clover, dandelion, willow, violet, elder and azalea. The beetle is very prolific and the total life cycle of the insect is one year most of which time is spent in the soil as egg, grub or pupa. They are omnivorous, resistant to unfavorable conditions, strong fliers and very active during warm, clear days. They choose grassy or weedy ground, unshaded by thickets or trees, in which to lay their eggs and prefer moist, loamy soil to dry, sandy soil or swampy areas. In fighting this

beetle, great areas have been thoroughly gone over, brush and weeds destroyed and burned and the soil in sections heavily infested sprayed with sodium cyanide to destroy the grubs. Erroneous statements have been published to the effect that the ravages of the beetle were so bad in New Jersey that practically everything was being destroyed by them and made unfit for use, and farmers in other parts of the country who desired to buy plants from this locality were dissuaded from doing so by these reports, which were not altogether true and somewhat farfetched. But the fact remains that they have attacked growing apples and trees, rendering the fruit unfit for market, have caused destruction to certain shade trees and injured such crops as field corn by cutting the green silk and thus preventing fertilization of the grain.

Future plans to prevent the spread of the insect have been worked out as follows:

By scouting, to establish as far as possible a limit to infestation.

By establishing a barrier.

IN 1911 Supervisor Grandjean procured seed of the big trees (*sequoia Washingtoniana*) from San Francisco. He planted these in the Forest nursery and in a couple of years transplanted them on his lots in Boise. Both of the trees are alive and doing well. The larger is approximately twenty feet in height and nine inches in diameter at stump height.—(*Daily News, Intermountain District*)

By treating roadsides in such a way as to minimize the chances of the beetles getting out of the area.

By killing the grubs in the ground by the use of cyanide in solution.

No absolutely effective poison has been found which

will kill the beetle, because those so far tested, either ruin the plant foliage, are ineffective poisons, or the beetle is repelled by the poison. Thus the beetle has so far proven somewhat immune to these usual deadly and effective agents, so the fight now being waged against the beetle is of great economic value. The beetle has been fairly well confined to the section where found and while some few beetles have been found on the Pennsylvania side of the river effective measures have been put forth to combat their further destructiveness. A campaign of



WORKING TO CONTROL THE JAPANESE BEETLE

In order to prevent the insects being carried in vehicles or on clothing, the shrubbery is cut close to the ground and then burned well back from the roadside in heavily infested areas.

education will have to be waged, in order to get everybody aroused and interested in the true nature of this Japanese Beetle, which has done and can do untold damage. More than \$100,000 has already been spent on the life, study, habits and inspection work, and other propaganda relating to the beetle, and by applied work of these thoroughly interested investigators, its ravages have been checked and its nature better understood. The farmers are, as a rule, very enthusiastic in giving every assistance possible to these men, in order to try and rid their farms of the beetle. As this section of New Jersey is one of the richest sections of the United States for the growing of market produce, efficient daily inspection of marketable produce, it is hoped, insures the pest being confined and ultimately wiped out. The young men who worked at Riverton during the past summer all were men who were fully interested in this work, and met with the finest kind of cooperation every day. They lived in tents along the river and here conducted valuable experiments which will mean much to this or any other area similarly affected.

YOU can't start forests from stumps, any more than you can start wheat from stubble. If we are to have timber in the future, we must grow it as systematically as any other crop.

THE man who is impatient, and will only attempt what he can see bear fruit, in a very short time will only grow success of the pumpkin and squash variety.

INSECTS AND SPIDERS

BY DR. R. W. SHUFELDT

(Photographs from life by the author).

IT is the usual impression among those who have paid but scant attention to anything bordering on Nature Study in general, that the spiders and insects of the world all belong in the same assemblage, and that they may be referred to, as a whole, as insects—such as beetles, bees, and butterflies. This is quite wide of the mark, and it is the object of the present article to throw a little light on the question.

Spiders, for instance, have eight legs; all the insects so-called, have six. Spiders have no antennae and no wings. Spiders have one pair of jaws, the insects have two.

The centipedes, “thousand legs” and their near allies, are insects and not spiders.

We have some very remarkable spiders in the United States and many of them are very well known. For instance, the common yellow and black “garden spider” is familiar to nearly every one, and four examples of them are here shown in Figure 2, they being the larger ones in the cut. In summer, many of these are found in old fields where goldenrod and dogbane grow, and where the grass and other vegetation is coarse and rank. They construct a beautiful “orb-web”—a structure that may frequently be seen in city and country gardens, however small the first-named may be.

Our biggest spider is the Texas Tarantula; and unless one has especially looked the matter up, few there are that could guess how the spiders called tarantulas ever had had such a name bestowed upon them; least of all would it be suspected that the name was derived from a *dance*.

Now, many years ago, a certain class of Italians greatly feared the bite of one of these venomous spiders, and, swayed by the superstitions of the time, they inaugurated a dance at the city of Taranto, in southern Italy, to which

they gave the name of “tarantella.” Only a single couple performed it, one or both of whom had been bitten by a tarantula. So maniacal was this dance in its whirling and giddy figures that it was regarded as a mania to which the name of “tarantism” was given. After a while it came to pass that one had but to suspect that he or she had been bitten by a tarantula in order to at once find a partner, and then and there commence to dance the tarantella or tarantelle, as it was also called. This was along in the sixteenth century, at a time when many believed that the tarantella was an absolutely certain cure for tarantula bite. As time passed, the nature of the dance underwent a very considerable change, as it began to be accompanied by music of a peculiar, rapid rhythm, and six couples took part in the dance, which had lost none of its insane, whirling character.

The name tarantula is also applied to a certain fish and to a lizard, while in southern Europe it only suggests the big *wolf spider*.

There are many species of tarantulas described, and a large number of them occur in the Americas. The one here figured is from Texas, and the writer had it alive for some time. Not only is it one of the largest spiders known, but a most dangerous and vicious creature. It was not an easy subject to photograph, as it had a way of jumping some

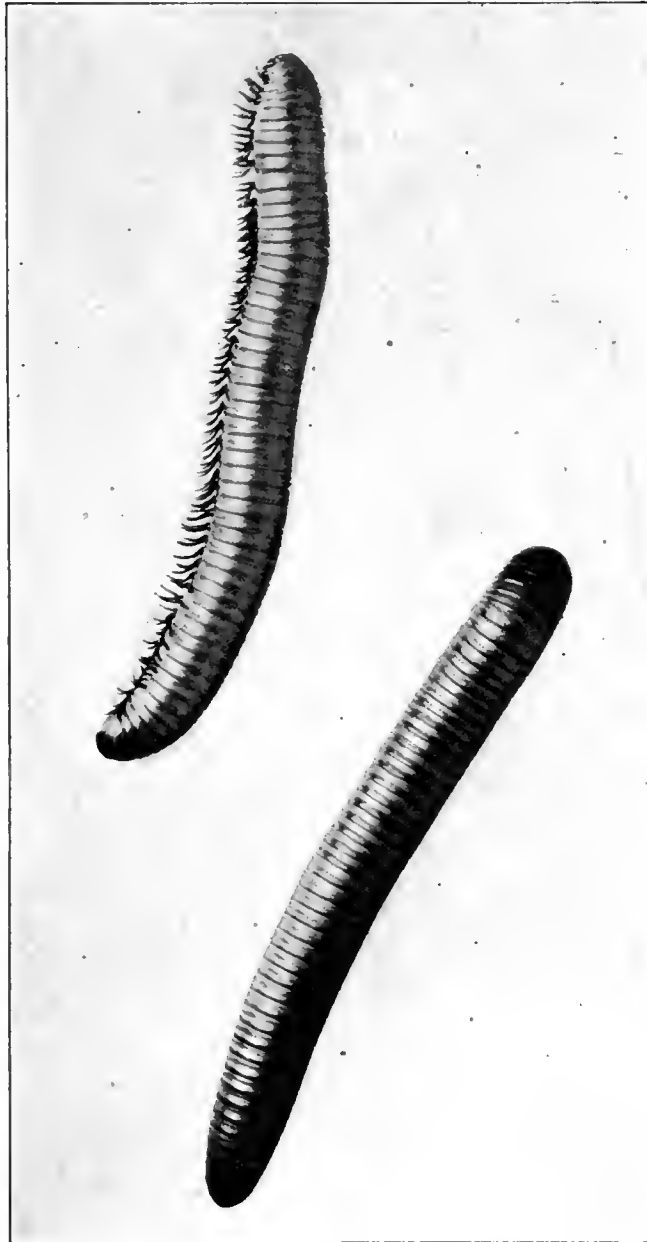


FIG. 1 A PAIR OF LARGE MILLIPEDS FROM FLORIDA

This insect is of a beautiful chocolate brown color, being more lightly tinted at the joints. It can curl itself up in a circular manner like its little relative of the north.

Texas, and the writer had it alive for some time. Not only is it one of the largest spiders known, but a most dangerous and vicious creature. It was not an easy subject to photograph, as it had a way of jumping some

five or six inches, when least expected—evidently with the intention of inflicting a bite. From tip to tip of its outstretched longest pair of legs it measured a little over six inches. Most of the tarantulas are hairy species, and hardly to be considered in any way handsome or otherwise attractive—even by a naturalist.

These big spiders, also known as “crab spiders,” frequently catch small birds, especially humming birds, and feed upon them. On the other hand, however, a great wasp is found in the regions where they occur, which has been called a “tarantula killer” on account of its habits, as it habitually hunts for them, stings and paralyzes them when found, and then deposits the helpless victim in its burrow, lays an egg there, from which, in time, emerges a larval wasp, to find a tarantula feast already set forth, upon which it at once proceeds to dine. Occasionally one may come across a tarantulated hum-

er or other small bird. should one be so fortunate as to meet with the same at about the time it had been attacked and bitten by a tarantula. However, such occurrences must be rare. Many are of the opinion that no ill effects follow upon the bite of a tarantula, beyond such symptoms as usually supervene after the bite of any animal suspected of being venomous. However this may be, the writer has reason to believe that the bite of one of these big, hairy fellows is more or less poisonous, and, in some cases, highly dangerous. There is also a scorpion called a tarantula, for the reason that it resembles one of the latter in general appearance; otherwise its tarantular characteristics are but imaginary.

Closely related to the true tarantulas are the “trap-door” spiders that build very remarkable nests, with a neat, close-fitting trap-door to them; but, upon the other hand, all true tarantulas burrow in the ground, or construct a regular nest resembling a small bird’s nest, or they may simply live under stones or under the bark of trees.

Although by no means a rare species in most of the Southern States, the Silk Spider, the scientific name for which is *Nephila clavipes*, is interesting for all that. Dur-

ing last summer (1920), Mr. R. H. Young, of Bradentown, Florida, sent the writer a fine, living specimen of one of these spiders, and an excellent photograph was at once secured of it, giving it natural size; this illustrates the present article.

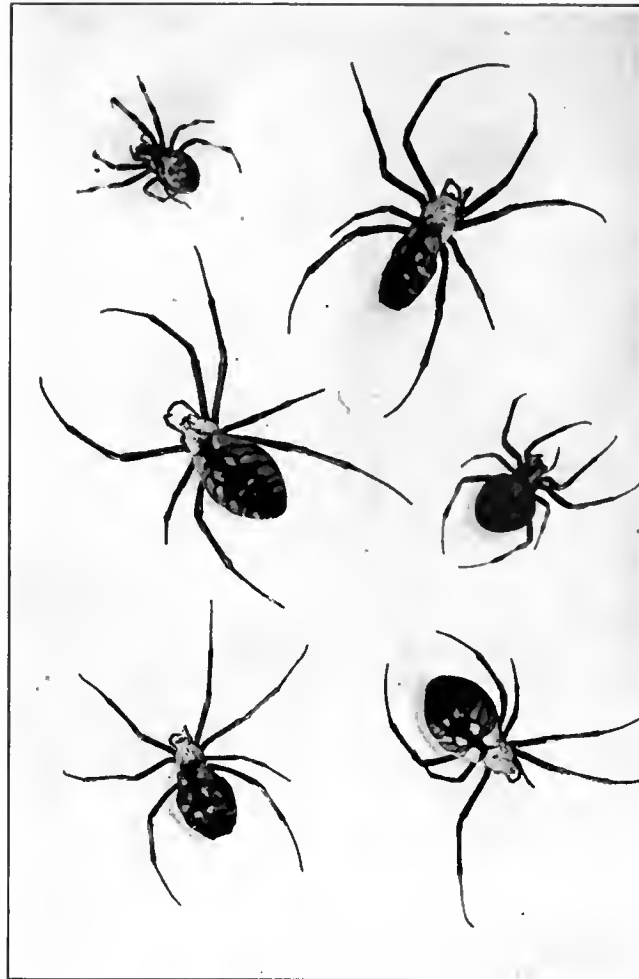


FIG 2. FOUR LARGE GARDEN SPIDERS WITH TWO OTHERS

Garden Spiders vary not a little in form and markings, due to sex and age. They build a beautiful orb web, capturing and devouring many grass-hoppers in the course of a season

In the cut we may note the curious tufts of hairs at the flexures of the eight long legs, and the elongate abdomen with its pretty double row of dots. The rest of the body is white with a pair of tiny black spots, which look for all the world like the creature’s eyes. At the time of its capture, Mr. Young noted that it possessed a sort of chameleonic power, its body—that is, its abdomen—changing from one shade of brown to another, being for a moment a dark umber, passing to a light ochre, and back to brown again. This the writer was able to verify after it came to hand.

Nephila spins a beautiful web, as do its relatives in the tropics, where numerous of these species occur.

The study of spiders is a wide field, as thousands of species have already been described, and we have not a few popular and beautifully illustrated books on the subject. As stated above they differ from insects, one difference being that spiders possess four pairs of legs (coming from the thorax), while true insects have but

three pairs. The spiders are related to the true scorpions, to the mites, and to others, and they breathe by lungs and tracheae. For example, so necessary is air to them that the diving spider sees to it that it exists in its sub-aquatic home. It “weaves itself a curious little bell-shaped dwelling,” says a popular writer, “at the bottom of the water, to which it retires to devour its prey. As, notwithstanding its aquatic habits, this animal, like the rest of its class, is fitted only for aerial respiration, it takes care to fill its miniature dome with air, which it carries down with it from the surface, among the hairs with which its body is thickly clothed.”

Then, other spiders, as well as some of their close allies, are more or less dangerous to man, as the dreaded tarantulas and the scorpions. Anatomically, they are remarkable; while their relatives, the *mites*, possess but one ganglion in the body, and utterly lack a heart, a

brain, and a windpipe! Their mouth-parts are wholly rudimentary. True spiders have a liver, which no insect with wings is known to have.

A few years ago, the writer photographed a tarantula—one of the giants among spiders—that was seven inches across, measured on its extended legs. Relatives of this dangerous fellow in South America and Mexico often prey upon humming-birds, which, it is said, they climb trees to capture.

Others of our spiders weave a beautiful silken sphere about their eggs, carrying it about until the young hatch out; and the achievements of the trap-door spiders are well known to many. Elegant webs are woven by some species, and many forms are brilliantly colored, being figured and spotted in a way most bizarre.

We have in the United States a long list of those insects we usually designate as beetles. There are some fifteen thousand different kinds of them, and they range in size all the way from little bits of ones that it almost requires the use of a microscope to see, to such giants as the Spotted Horn Beetle shown in Fig. 5 of the accompanying cut.

Some of our beetles are of a very plain color—often a dead black or lustreless brown, while others reflect all the prismatic colors of the rainbow. During the summer of 1920, the United States National Museum kindly loaned the writer over twenty of the commonest forms of American beetles; a dozen of these he photographed, and a reproduction of this illustrates the present article. All of the beetles thus shown are abundant species in one part of the country or another, and all of them present interesting life histories. Many of the readers of *AMERICAN FORESTRY* will recognize some of them on sight; a few will know all of them, while several of the forms figured in it will be of value to foresters to know, as they have to do with the welfare of, or are more or less injurious to, some of the trees of our forests or to our shade and fruit trees.

When fully adult, an ordinary beetle may be recognized through its having its front or superficial wings hard and stiff, and much thicker than the semi-transparent ones they cover. These hardened wings meet down the middle line of the body by contact of their

inner borders—they are called the *elytra*, and their line of contact the *suture*. In a few groups, these elytra do not cover the abdomen posteriorly; but this is not the case with any of the beetles here shown.

Larvae of beetles possess no legs on the abdomen, with the exception of the last joint, where it is not uncommon to find a pair. In the adults, the mouth-parts are constructed for chewing. Running beetles are wingless, as a rule, the exceptions being where these structures are present but fused together at the suture.

"Grubs" are the larval forms of beetles. Most, if not all grubs, possess three pairs of jointed legs on the thorax. Among the larvae of the "snout-beetles" we find no jointed legs present whatever, and a study of their structure is a very interesting subject, not to say an important one.

With the exception of the Spotted Horn Beetle (No. 5), the writer has collected in nature all of the beetles shown in the cut—some of them many times, and made notes on the habits of each. The only Spot-

ted Horn Beetle he observed alive was in New Orleans early in the eighties. It flew into a room of his quarters at Jackson Barracks; and, as it struck the wall and fell to the floor it sounded as though someone had fired a stone at the occupant. As the room was dark—the lamp having been extinguished—the beetle almost immediately took to flight again, making its escape through the open door. Lutz says of it that "The common name, Unicorn Beetle, is scarcely correct, for the males have three horns on the pronotum, the ones on the sides curved and very short, the median one with yellowish hair beneath notched at the tip, and projecting forward to meet a long, curved horn arising from the head. The females have only a



FIG. 4. A CURIOUS SPIDER FROM FLORIDA

This specimen was captured and presented by Mr. R. H. Young, of Bradentown, Florida, and the reader is invited to note the peculiar hairy tufts between the leg-joints.

slight tubercle on the middle of the head. It is a southern insect, rarely seen even in southern New Jersey, for example; I have found larvae, pupae, and adults abundant in rotten wood in southern Mississippi." It is the largest of all North American beetles, and gives forth a very disagreeable odor when handled. Young beetles of this species, directly after passing from the pupa stage, are of a rich brown color; but as they become adult, they gradually change to a beautiful gray on the wings, sometimes verging on a deep orange on the head. The elytra, as seen in the cut, is irregularly spotted with black spots of various sizes and shapes. In some specimens the ground color is of a greenish gray. Sometimes, in collections, specimens of this beetle have a way of turning entirely black — first one side of the body and then the other. West Indian Hercules beetles also belong to this group, and they are the largest of all known existing species; it is said that the horn on this beetle's head is at least three or more inches long.

While living in southern Connecticut, the writer frequently captured specimens of the Cloaked Knotty-horn; they were always found on elder-berry bushes. It is known that the larvae enter the pith of that shrub, and that the beetles appear during midsummer. They are rare in the District of Columbia, the writer having captured only a single specimen after hunting for it during several summers. It is a very beautiful insect, the head and hinder halves of the wings being of an intense blue, the rest a rich orange. This latter character accounts for one of its common names, as it has the appearance of having a little cloak thrown over its shoulders. It is also called knotty-horn, and the structure of its antennae will account for this (No. 1.)

Down in South America they have some elegant insects which they call Buprestids, while those we have are rather modest little species, such as the Virginia Buprestid, shown in No. 2, it being one of the largest species of the genus in the United States. A Maryland specimen taken by the writer had a length of one and a quarter inches; it was of a brownish black color, slightly bronzed, with darker markings. These insects are wood borers, attacking pines, and, consequently, harmful to those trees, and sometimes the damage they do is very extensive. One can readily recognize it by its rough and ridged elytra.



FIG. 3. A LARGE TEXAN TARANTULA

The bite of this species is dangerous and they have the habit of suddenly jumping when near the object they attack, either in an offensive way or to capture their prey.

Mahogany brown in color, with the under parts much lighter, the Straight-bodied Prionus is well named, as the sides of the elytra are nearly parallel for their entire lengths (No. 3). Note the spines on the sides of its neck—they assist in identification. It seems that there are no reports published charging this insect with doing damage to our forest trees. Sometimes the larvae are found in hundreds in dying hemlocks, where they were not concerned in the

killing of the trees; they also occur in rotten pine stumps. Packard gives us an excellent cut of this beetle in his "Forest Insects," and says of it that "Mr. Calder has also found the fully-grown larvae in August in maple logs at Warwick, R. I. and in the rotten wood of another deciduous tree. So that it appears that this beetle lives indifferently in the soft, decayed logs or stumps both of hard and coniferous trees."

Stag beetles of the species shown in No. 4 are of a very dark brown color, and get their name from their big mandibles or jaws, which resemble miniature antlers of a stag or deer; these are shorter in the female insect.

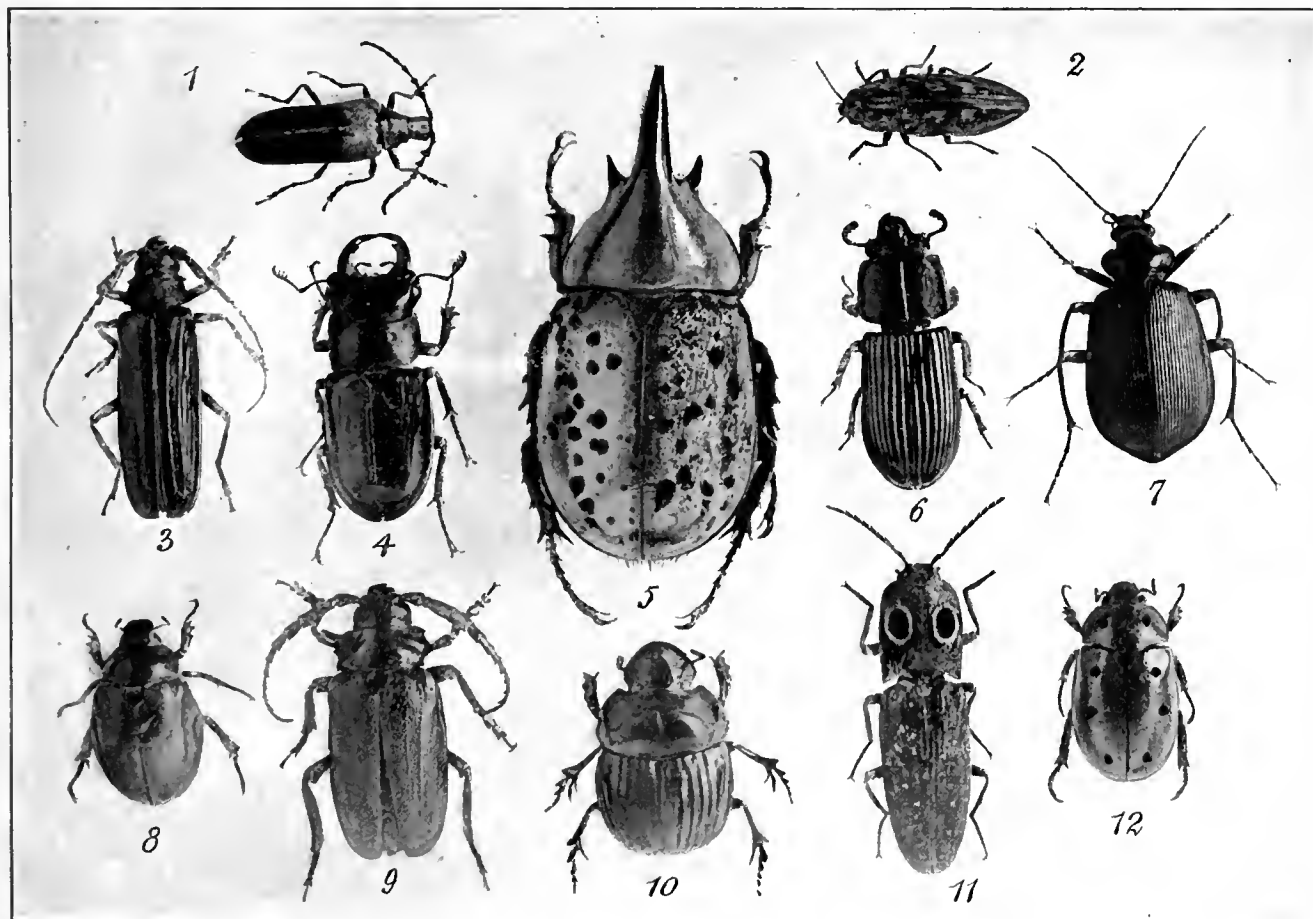
One may meet with the plump, yellowish-white larvae in rotten oak and apple stumps, and in some others. Dr. Lutz says this beetle is very abundant near New York.

A related form of the Stag beetle is the Horned Passalus (No. 6), a very abundant species in the District of Columbia. The writer has generally found them under the bark of fallen and decaying pine and oak trees. Sometimes as many as twenty or thirty beetles occur under a piece of bark not over a foot and a half square. They have sharp little median horns projecting forwards on their heads; are almost black, and very glossy—indeed, one may say they are quite handsome creatures. When disturbed they rub their hard, outer wings together, and thus give forth a peculiar, hissing sound; so should one have a dozen or more of them in a dry box, their concert may be heard across an average-sized room. Some country people call this beetle the Horn bug.

The Searcher (No. 7) is one of the most beautiful of all United States beetles, its hard and somewhat rough elytra shows a great play of color when held in different

lights. At one angle it appears to be of a rich azure, and, turning it various ways, this passes to gold, or red, and then to brilliant green and violet. It is a most beneficial insect in our forests, as it hunts and devours no end of caterpillar pests; indeed, the country folk call it the Caterpillar Hunter, and are more or less familiar with its habits. In nature we find them under stones and sometimes old logs. Occasionally they fly about the city street-lights. So industrious are they in their hunts for canker-worms and caterpillars that they will climb up trees for them, and devour them as they are in the act of destroying the leaves or fruit. One kind of caterpillar preys on the leaves of the oak trees in the West, and this pest is destroyed by the hundreds by this handsome beetle. Miss Emma A. Smith gives a fine account of this in the January 9 issue of the *Prairie Farmer* (1878).

Another very handsome insect is the Goldsmith Beetle (No. 8), a superb and not abundant species that looks as though it were made of solid gold, it having a coppery-



A VARIETY OF BEETLES

Fig. 5. The species of beetles here figured, natural size, are described in the article; so, for the reader's convenience, it will only be necessary to give a list of them here:

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|--|--|
| 1. Cloaked Knotty Horn (<i>Desmocereus pallictus</i>). | 7. The Searcher (<i>Calosoma scrutator</i>). |
| 2. Virginia Buprestid (<i>Chalcophoca virginica</i>). | 8. Goldsmith Beetle (<i>Cotalpa lanigera</i>). |
| 3. Straight-bodied Prionus (<i>Othosoma brunneum</i>). | 9. Broad-necked Prionus (<i>Prionus laticollis</i>). |
| 4. Common Stag Beetle (<i>Lucanus dama</i>). | 10. Tumble-bug (<i>Copris carolina</i>). |
| 5. Spotted Horn Beetle (<i>Dynastes tityrus</i>). | 11. Eyed Elator (<i>Alaus oculatus</i>). |
| 6. Horned Passalus (<i>Passalus cornutus</i>). | 12. Spotted Pelidnota (<i>Pelidnota punctata</i>). |

greenish hue beneath. It feeds on the leaves of various trees, being especially harmful to pear trees, and in a less degree to oaks, elms, hickories, and other kinds. This form gets its scientific name from the fact that the under side of its body has a "wooly" covering, and it seems to occur in greater numbers in New England. Many life histories of the Goldsmith beetle have been published, and a long and interesting account of it will be found in Packard's "Insects Injurious to Forest and Shade Trees" (pp. 274-276). This valuable work for foresters was published by the U. S. Department of Agriculture in 1890, and may be found in many general libraries.

In the work just cited, we also find an admirable and illustrated account of the Broad-necked Prionus (No. 9).



FIG. 6. POTTER-WASP AND NEST

This insect is by no means an abundant one, while perfect specimens of the little pot it makes are rather rare objects in museum collections.

and a year or more ago the present writer gave an illustrated sketch of this beetle in AMERICAN FORESTRY. Packard says of it, "Though usually living in the roots and trunks of the poplar and balm-of-Gilead, Mr. F. Clarkson states that at Oak Hill, Columbia County, New York, this borer infests the black oak, the beetle emerging at twilight during the first two weeks in July." He figures both the pupa and the larva.

Tumble-bugs are among the most remarkable insects that we have (No. 10), and the habits of many of them are very extraordinary. One United States species is very brilliantly colored. They are also called "dung beetles," for the male and female will roll up a ball of dung—cow dung—considerably bigger than either one

of them, and tumble it over and over down a dusty country road in a way most remarkable to behold. At the end of such a long journey, the female lays her eggs in this ball, and then buries it. The tumble-bug here shown is a male, and so exhibits the "horn" on its forehead—a character scarcely developed in the female. Life histories of tumble-bugs in various parts of the world are wonderfully interesting. Professor Comstock, of Cornell University, in writing of them said that "this is one of the instances, rare among insects, where the male realizes that he has some responsibility as a father, and assists the female in providing for the young." To this order belong the Scarabs, a tumble-bug held to be sacred by the ancient Egyptians (*Scarabæus sacer*).

A most striking beetle is the big, gray and speckled Eyed Elater, shown in No. 11, with the pair of elliptical black eyes on its thorax. This is one of the "clicker beetles," and during some summers we may meet with several of them. However, the writer has never found them to be over-abundant, having discovered, perhaps, up to date, a dozen or more. Its larvae occur in decayed trunks; and upon the whole, this interesting species is not considered especially destructive to trees or plants. Old, rotten apple-tree trunks is a good place to hunt for its larvae, and the beetle preys upon other insect larvae. More than 500 different species of these clicker beetles occur in the North American insect fauna.

Among the grape-vines in midsummer is the place to look for the beautiful Spotted Pelidnota (No. 12), and many people are very familiar with it. It feeds upon the leaves of the grape, both the wild and the cultivated kinds; but it does little or no harm, and is, withal, one of our handsomest beetles. Beneath, it is bronzy-green, and a shiny, tan-brown above, being spotted as shown in the accompanying illustration. Most often the writer has found its larva in old, dead stumps of the hickory and different species of oak.

Many species of beetles other than those figured and mentioned here have most interesting histories, and they would appeal to those foresters who investigate such matters. A large number of them, or their larvae, are dangerous enemies of our shade or forest trees, and among them may be mentioned the Sawyer that destroys evergreen trees; various species of the Snout-beetles, and, indeed, a perfect host of others, a mere list of which would carry this brief article far beyond the limitations of our space.

Of all the families of wasps in this country, none can exceed in interest the one known as the "potters," of which family there are several genera. They have earned their name from the fact that they build a nest which for all the world closely resembles a little clay pot or jar (see figure); and the circumstance that clay is the material used, in no way detracts from the resemblance. Some of these nests are of very light color, as was the one here figured, while others are much darker, being of a rich earth-brown. They are very rarely discovered, which is chiefly due to their small size and to the secretive habits of the makers of them, and there are not a

dozen specimens of these little nests in the immense collections of insects in the United States National Museum, at Washington. Last July (1920), the wife of the writer discovered the one here figured on Eighteenth Street, in Washington; it was attached to the under side of a leaf of an elm tree, near the corner of Park Road. Unfortunately, the wasp that built it was not in evidence. At this writing the specimen is in the insect collection of the National Museum. One of these solitary wasps is shown on back view in the accompanying cut, it having been drawn by the writer in that some idea might be gained of what curious little fellows they are. It is the *Eumenes*

jar is sealed up. Quietly these little black and yellow wasps do their work; while not one farmer or agriculturist in an hundred are even aware of their existence.

Of all the known insects in the world, and there are untold thousands of them, there is no assemblage more remarkable, or filled with extraordinary interest, than is the natural history of ants.

There is a perfect host of species of ants, while, as a rule, they have for the most part been grouped in the family *Formicidae*, representatives of which are found in a great many parts of the world, aside from the polar and subpolar regions.



FIG. 7. IMMENSE NEST OF THE BLACK WOOD ANT

Probably it takes the ants a long time to build this mound, and several generations of them take part in it. Were we to cut a mound like this one in half, vertically, in such a manner as to show its internal construction it would be seen that the part above the surface of the ground contains some ten or more tunnels leading down into the ground below, and these terminate in distinct roundish cavities, some seven or eight in number, all interconnecting with each other. They are subterranean storehouses in which the ants store their food for winter use.

fraternus of science. The light markings are yellow, and the rest of the head and body black. Some of the species burrow into the pith of plant-stems, lining the excavation with clay. From an economic standpoint, this extensive family is an important one, as they kill and devour every year thousands upon thousands of the larvae of moths, butterflies, and beetles that feed upon the vegetable products of the farm and fruit-orchards. When a potter wasp meets with a caterpillar to its liking, it stings it, which completely paralyzes the victim. It then packs it away in its little pot, where it will constitute food for its own larvae, which will hatch out before the

We have many species of them, as well as their near relatives, in this country, and our economic and general entomologists have given them a very large share of attention. Whole bulletins and many elaborate works have been published on the biology and the ecology of ants, and yet we have hardly touched upon what still remains to be known about them.

"Certain ants enslave other species," says Packard, "have herds of cattle, the aphides; build complicated nests, or formicaries, tunnel broad rivers, lay up seeds for use in the winter time, are patterns of industry, and exhibit a readiness in overcoming extraordinary emer-

gencies, which show that they have sufficient reasoning powers to meet the exigencies of their life; their ordinary acts being instinctive—namely, the results of inherited habits. The leaf-cutter ants of Central and South America are famous from their leaf-cutting habits; the soldiers have large triangular heads, while the workers have much smaller rounded heads." What is said in this brief quotation is the merest hint with respect to ant history.

In some countries different species of ants systematically declare and go to war with each other. They organize armies down to the minutest detail; drill; march in column; deploy; use scouts; arrange and sustain a medical corps; attend to their wounded—carrying them off the field when disabled and so on. In some parts of Africa most remarkable species of ants occur, some of the species being so numerous and bite so severely that our own species are in peril when invading their territories.

In Figure 7 the writer gives you the reproduction of a photograph he made of an enormous ants' nest found by him near Cherrydale in northern Virginia. It covered a circle some fourteen feet in diameter, and, from apex to base in the center, had a height of four feet or rather more. Ants erected this entire mound, and many thousands of the large black species of that region occupied it at the time of its discovery. It was permeated by passage-ways in thousands of directions, and yet there was no evidence of confusion among the inhabitants when any disturbance aroused them, as stepping upon or pushing a stick into the heap. They rallied to the spot *en masse* and at once swarmed over the offending intruder or whatever was used to stir them up. Their bite is quite severe, and they will allow the twisting off of their heads before letting go their hold.

Hundreds of recorded experiments have proved beyond all manner of doubt that some species of ants possess excellent memories; they recognize their kin and greet

friends and relatives by "shaking hands" with their antennæ. They possess a fine sense of direction and orientation.

While living in Habana, Cuba, the writer enjoyed studying a very minute red ant no bigger than the point of a pin. They invariably put in an appearance at breakfast time, usually coming from some crack in the cement wall of the room near the floor. They marched, single file,

skirting all impedimenta, to the breakfast table. Arriving at the nearest leg of the latter in the line of their march, they ascended it, still in single file, and reaching the underside of the table cloth, they passed over it; and when once on top, over they went to the sugar-bowl to feed. They swarmed over the sugar *en masse*, and, after gorging themselves, returned to their retreat in the same order in which they came. This happened every morning until we finally broke it up by placing the feet of the table in small pans of water. They could not swim! But to appreciate the extraordinary history of ants, especially the South American and African species, one should study them in their habitats as well as read about them.

There is no more interesting chapter in the history of insects than the one which touches upon their protective mimicry and coloration. Much, too, has been published and illustrated on this fruitful subject, even entire books have been devoted to it, an excellent one in mind being "Animal Coloration," by

Dr. Frank E. Beddard, F. R. S., Prosector of the Zoological Society of London. Plate II of that work presents a colored representation of the famous Kallima butterfly.

Nearly every family of insects and spiders offers us examples of protective coloration and mimicry, while only a comparatively few of them have been properly described; it is an inviting field for the young descriptive naturalist.



FIG. 8. KALLIMA BUTTERFLY OF THE EAST INDIES

One of the most perfect examples of protective mimicry among insects known to science. The insect is of a rich orange, blue and purple with finer markings. It is shown both open in flight and also closed on the twig.

A REAL MEMORIAL TREE

BY J. RUSSELL SMITH

WHY should a memorial tree be useless when it might just as well combine both use and beauty? Which would you rather have your memorial tree produce, leaves only, or leaves and nuts?

Trees are among the noblest of memorials, but they might just as well be nut trees, yielding edible fruit, as oak trees yielding inedible fruit, or other kinds of trees yielding nothing but leaves.

For beauty, no trees are more majestic or more beautiful than three native American nut trees, the pecan, the black walnut and the hickory.

There are now available for planting, grafted nut trees of one or more of these three species suitable for all that part of our country where wild specimens of any of these species grow, and for other territory beside. For example, varieties of pecan native in Indiana and Illinois will grow in all the lower elevations in the territory south of a line from Chicago to Boston. We do not yet know just how far north the northern pecan tree will bear fruit, but they will make beautiful trees as far as the line mentioned. Even to the north of this the hardy northern grafted hickories of the delightful shag bark variety will ripen their deliciously flavored nuts.

Black walnut trees have been found whose kernels come out in whole quarters, the pecans and shag barks in whole halves. The making of such trees for the market is a new art and a new business that will, in time, give us a great new industry offering many memorial trees of the highest attraction and desirability.

FAMOUS MORSE ELM GOES DOWN

The famous Morse elm, at the corner of Pennsylvania avenue and Fourteenth street, is gone, says the *Washington Times*. It was taken down at midnight following a long but losing battle for its life.

The famous elm, one of the first trees given a place in the Hall of Fame for Trees with a History by the American Forestry Association stood at the corner in front of the Willard Hotel and had seen every inaugural parade in Washington. It was named for Samuel F. B. Morse, inventor of the telegraph, who, tradition relates, often sat beneath the tree in the old days and recited to anyone who would listen the wonders of the telegraph. Many famous politicians met beneath the elm. The trunk of the tree was presented to the American Forestry Association.

Morse was born in April, 130 years ago. May 24 was the seventy-seventh anniversary of the opening of the first telegraph between Baltimore and Washington. Fifty years ago, in 1871, a bronze statue was erected to Morse in Central Park, New York City. He died April 2, 1872.

A delegation from the John Burroughs Club of the Force School, as guests of the American Forestry Association, visited the old tree Friday afternoon and Clifford Lanham, superintendent of trees and parkings, who di-



National Photo

THE LAST VISIT TO THE OLD ELM

The John Burroughs Club of the Force School sent delegates to pay a last tribute of respect to the famous old tree on the afternoon of the day it was taken down.

rected the operation of taking down the tree, explained to the children why it had died. In the delegation were Harold Roach, Charles Keene, Esther Rogers, Margaret Lowe and Dorothy Sheckells.

"Cutting away many of the roots of the tree to widen Fourteenth street killed the old elm," Lanham told the children. "Then, too, little or no air or rain could get to what roots were left. However, I will put a new tree there and see what we can do toward keeping it alive."

Lanham picked out the hour of midnight to take down the tree because of traffic conditions at that busy corner. Block and tackle were put in place by a big crew of men.

ANOTHER ROOSEVELT TREE

The first agricultural society to register memorial trees with the Association is the Agricultural Society of Queens-Nassau Counties, at Mineola. The trees were registered by Lott Van de Water, Jr., the secretary, and marked with the official marker. Theodore Roosevelt, for whom one of the trees was planted, often visited the grounds and spoke there.

The trees are of the scarlet oak variety, the acorns gathered from the grounds ten years ago and planted, developing into full growth.

President Robert C. Baird, of the Society, spoke briefly of the Memorial observance, and when markers were placed upon each of the five trees, told of the service given by those to whom the trees were planted.



MEMORIAL TREES AND MARKERS FOR NEW YORK BOYS

Underwood and Underwood National Photo

(Upper corner) Mrs. Catherine Dunn, mother of Capt. George Dunn, of the 77th Division, who was killed in France, planting a memorial oak in Central Park, New York, at the spot selected by J. S. Kaplan, forester of the Department of Parks.

(Lower) Large memorial tree marker for Company E. 307th Infantry, 77th Division, showing names of members registered on the national honor roll of the American Forestry Association. Hamilton Fish, Jr., now member of Congress from New York, formerly a major in the 77th Division, is inspecting the marker.

The first marker, placed by Mrs. Frank Arenet, of Hempstead, a descendant of Judge Effingham Lawrence, who was first president of the Society in 1841; the second, in memory of John Harold, former secretary and treasurer of the Society, by I. Cornell Remsen; the third, in memory of Thomas H. Bacon, who had been treasurer of the Society

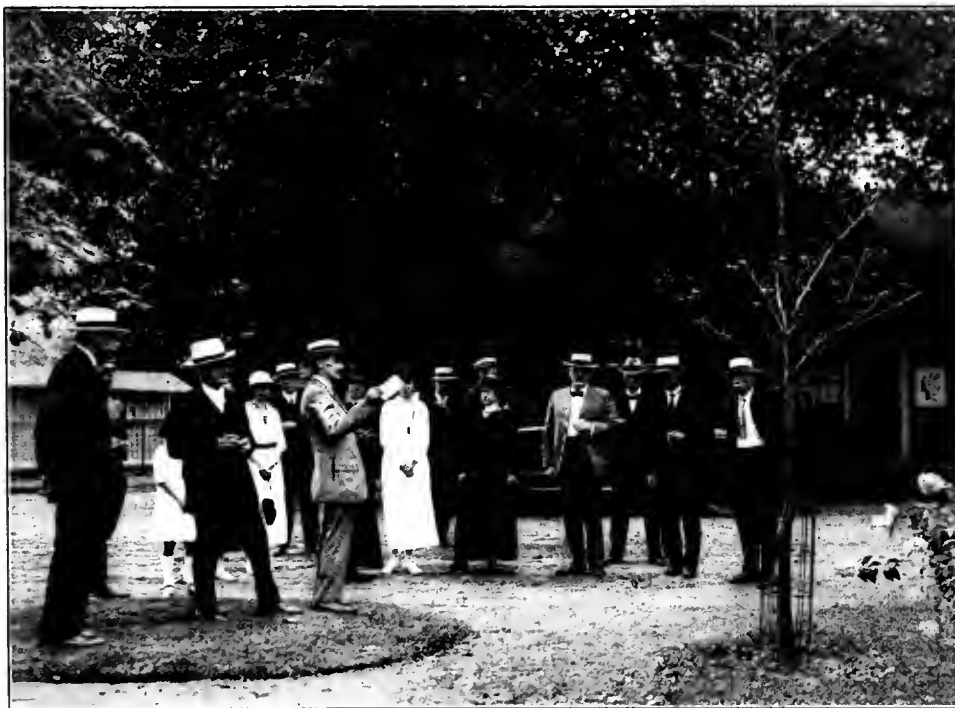


Photo by Burt

THE DEDICATION

This is the first tree to be planted by an agricultural society and registered with the American Forestry Association, and it was dedicated to the memory of that great tree lover—Theodore Roosevelt.

36 years, and also for many years secretary of the race department and manager of the Society, was placed by Miss Lavinia C. Bacon, a daughter of Mr. Bacon; the fourth in memory of Col. Theodore Roosevelt, was placed by Capt. R.L. Vandewater; a fifth in memory of the soldiers who had died on the fair grounds, while the place was used as a base hospital.



National Photo.

MRS. MEDILL McCORMICK PLANTS THE ILLINOIS TREE

It was particularly appropriate for Mrs. Medill McCormick and her children to plant Illinois' gift to the American Forestry Association, as the Chicago Tribune, owned by the McCormick family, is aiding vigorously in the campaign for planting of memorial and roadside trees throughout the country.

"EVERYBODY LOSES WHEN THE FORESTS BURN,"

THE call of the American Forestry Association on the editors of the country to rally to the proclamation of President Harding for Forest Protection Week was answered from every section of the country. Data from the Association's news service was carried in full by hundreds of

SPEAKING OF FOREST PRESERVATION—HOLLAND HELPS.



Berryman—in the Washington Star.

them and commented on. The Baltimore *Evening Sun* told the whole story in a one line editorial which said "Everybody loses when the forest burns." This "one liner" followed a longer one that went into the forestry question at length. Some of the comment in part follows:

Collier's Weekly: President Harding's proclamation designating Forest Fire Protection Week will have interest for you when you know some of the important facts behind it.

Whether you buy, own, rent, or build, the cost of the house you live in is materially affected by every forest fire which further depletes this nation's supply of lumber timber.

Berkeley (Calif.) Gazette: Forest Protection Week, will result in a still stronger demand for a national forest policy in this country, says a statement from the American Forestry Association. In the Snell Forest Policy Bill is provision for cooperation with the states in forest fire prevention and the proclamation of President Harding will, the Association says, go a long way toward putting this important subject right up to the people. National demand for a real practical national forest policy is evidenced by the endorsement of the Snell Bill by nearly 100 organizations of all types of industrial and social groups in the United States.

Providence Bulletin: The new bill in congress is sponsored by the American Forestry Association and favored by several large groups of users of timber—bodies with interests so large and so widespread they are not likely to want to mis-

lead the government into an unprofitable venture. Reforestation is insurance against a form of bankruptcy in national timber resources that is undoubtedly in prospect if the country does not mend its ways.

Utica Telegram: We Americans are a reckless sort of people, in many ways. We have been prodigal of the natural resources with which Providence has endowed us. Especially, have we wasted our supply of timber, both by wantonly cutting down more than we needed and, still more, by not guarding against the hazard of fire.

Washington Times: That little spiral of smoke for which the forest ranger watches in Oregon has a direct effect upon the man in Maine who likes a Florida orange for his breakfast now and then.

If the spiral of smoke breaks into a roaring, scorching forest fire we are all affected. Do you buy a new hoe for the



Gibbs—in the Baltimore Evening Sun.

garden this spring the forest fire hits you. The hoe handle is made of wood; your breakfast orange comes in a wooden box just as do thousands of other things touching your daily life. The price of lumber influences the cost of your breakfast.

Philadelphia Inquirer: That we Americans have scandalously wasted our great natural resources is an admitted fact. For years we have acted upon the theory that they are boundless. This criminal extravagance has been nowhere more evident than in the destruction of our forests. Even now, with all that has been said upon the subject, with all that has been done to stay further recklessness, the importance of forested areas to our national life is still imperfectly realized.

The Outlook: President Harding recently proclaimed "Forest Protection Week",

and Secretary of Agriculture Wallace has written letters to the Governors of all the States asking their cooperation in a nation-wide observance. The effects mentioned by Mr. Wallace are reinforced by those noted in a circular issued by the American Forestry Association. It declares that "fires destroy over \$25,000,000 worth of timber every year; and kill the reproduction upon thousands of acres of forest lands." Already we have a timber shortage, but within fifty years "it will become a blighting timber famine." Forests can be protected from fire, re-growth can be encouraged and conservative cutting can be practiced. But it takes from fifty to one hundred years to mature a timber crop. "Forest devastation must be stopped, lands now in forest must be kept continuously productive, and forest lands now devastated and idle must be put to work," concludes the American Forestry Association.

People's Home Journal: From a wooden bed, over floors of wood, through a wooden door to a breakfast table of wood—that is probably your morning routine. At table, in a newspaper made from pulp wood, you read dispatches brought over wires supported by wooden poles. Wood has been called the "backbone of industry." A dozen years ago President Roosevelt first awakened the nation to the alarming

THEN THERE IS THIS KIND OF WORM.



Knott—in the Dallas Morning News.

consequences of forest devastation. Does not even a moment's thought serve to convince you that the reforestation projects, which have been revived again in Washington, demand your most earnest attention?

Newark Evening News: By virtue of President Harding's proclamation for

SAYS THE BALTIMORE EVENING SUN

Forest Protection Week, the National Forest Fire Prevention Committee, is taking advantage of the opportunity to call public attention to the importance of the movement for the preservation of the country's forests. The menace of fire, which accounts for an annual loss of \$20,000,000 is emphasized, and an appeal is made to the individual to realize personal responsibility in the effort to reduce it. One-eighth of the value of trees thus destroyed is charged up to pleasure seekers and particularly to careless smokers.

Baltimore Evening Sun: Opportunities are appearing almost every day for Americans to prove whether they learned anything from the war. In no smaller degree does the opportunity exist to show whether we have learned by experience in the matter of conserving our national resources.

It is for the purpose of stimulating our thought in this direction that the national Government, in cooperation with the States, designated Forestry Week.

The wastefulness of the American people in respect to their forests would be criminal if it were not so thoughtless. During the war lumber was one of the essentials. With the ordinary grades we did not feel the pinch of necessity as we prob-

methods of timber cutting and the laxity of our precautions against forest fires, the supply of this material was largely confined to the two States of Washington and Oregon. Surely it would seem now that we should profit by the lesson and see to it that the spruce forests of those States are protected and spruce reserves elsewhere built up. But the forestry officials tell us that the same wasteful methods of cutting spruce are continuing.

Such considerations are well worth public attention, if Forestry Week is to mean anything at all. Even if we did learn such facts from our recent experiences, we have still to prove our purpose to profit by the lessons.

wasted our forest substance like the proverbially drunken sailor does his pay.

Yakima (Wash.) Herald: Forest resources in the east and south are at the point where 61 per cent of our total stand of saw timber lies west of the Great Plains, and over 50 per cent in the three Pacific coast states, according to the

WHY CAMPERS SHOULD BE CAREFUL ABOUT FIRES.



Perry—in the Portland Oregonian.

WILL IT COME TO THIS?



Donahy—in the Cleveland Plain Dealer.

IN YEARS TO COME.



Craig Fox—Rochester Democrat-Chronicle.

ably should twenty-five years from now, at the rate at which we are wiping out our timber resources and failing to replenish them. But there was one type of lumber which we did need very badly during the war—spruce. The wood is essential in the manufacture of airplane propeller blades. Due to the past wasteful

Rochester Democrat-Chronicle. — After all, the inertia and the apathy are the result of the lack of information. To be sure this is not easy to excuse. There is hardly a paper in the country which has not been hammering the idea of forest conservation into the public consciousness for years, to say nothing of the numerous and efficient organizations for such work. But, even if the ignorance is hardly excusable, the fact remains that the public is lamentably ignorant of forest needs. If this were not so there would be such a clamor for proper care of the dwindling timber supply that some deaf legislative ears would suddenly find that they could hear.

Washington Herald: By proclamation of President Harding, this is Forest Protection Week, when not the fancy, but the serious consideration of Americans is to be turned, neither lightly nor sadly, but constructively to the protection of our remaining forests, and the reclaiming by tree planting, otherwise useless lands. We have

American Forestry Association of Washington, which is directing the campaign for a national forest policy.

Is it not high time we took steps along the lines of the Snell forestry bill for forest protection?

Billings (Mont.) Gazette: State forestry, fortunately, seems to be on the eve of a remarkable development. A survey conducted by the American Forestry Association, says that keen interest is being manifested throughout the country in various phases of forest legislation. Montana has vast areas of timber, and should be as interested as any state in the union in the preservation and development of forests. The American Forestry Association points to the south where Texas is considering the adoption of a comprehensive forest policy with particular emphasis on fire protection and reforestation, and the adoption of a severance tax similar to that already in force in Louisiana. It is to be hoped that the movement will bear fruit in the enactment of a considerable number of progressive and effective forestry measures.

Newark Evening News: The report on the subject of the adoption of a national program of forest protection, recently submitted to the United States Senate by its

committee on reconstruction and production, of which Senator Calder of New York is chairman and Senator Edge of New Jersey a member, has evoked much comment in approval throughout the country. This report shows that a \$20,000,000,000 construction program would just about put this country on a pre-war basis.

Of it Charles Lathrop Pack, president of the Association, says in part:

"If any such program as outlined by the Senate committee, involving a reconstruction expenditure of \$20,000,000,000 can be even approximated at this time, it would bring us to forceful realization of the forest products situation that the American Forestry Association has been warning the public against for years. The Calder report is the greatest campaign argument on behalf of a national forest policy that has ever been put out."

Bangor Daily Commercial: The country has been called upon by President Harding to observe Forest Protection Week and the call comes with vital force to Maine for our state for its future prosperity is greatly dependent upon its forests.

We cannot too strongly point out the need of great care in the woods. The annual destruction in the country by reason of forest fires is approximately \$20,000,000, a distinct economic loss which can be avoided in great part by proper caution by those who visit the woods. Nor does the loss in timber spell the full loss. The re-

moval of the shade trees dries up the water courses and strikes a blow at the water powers.

Minneapolis Tribune: Minnesotans should have a peculiar interest in "Forest Protection Week" proclaimed by President Harding and the governors of many of the states. Governor Preus in his proclamation calls attention to the fact that the loss by forest fires in this state in the last five years aggregates \$30,000,000, or more than the aggregate losses in the next seven highest states.

It is important that school children should be taught the necessity of preserving the forests from fire. The American Forestry Association, which is concerning itself with forest protection and forest expansion, offers warnings that are equally good for old or young.

American citizens owe it to themselves and to those who shall come after them to maintain an adequate timber supply. It is good business and good sense.

Cleveland Plain Dealer: Through observances of one kind and another a serious attempt has been made to impress upon the people the serious condition into which our forests have fallen and to enlist them in a nation wide campaign of preservation and protection, particularly against fire.

All this loss can be avoided if campers and picnickers can be made to realize that the woods must be protected. There is a national loss involved in forest fires just as there is in the destruction by fire of

residence properties and business blocks. The value of the latter we recognize by insuring them. We should be willing to recognize the former at least by the exercise of reasonable precautions.

Atlanta Constitution: In an essential sense the idea underlying the motive for "Forest Protection Week" is to arrest the fearful annual wastage of American forests by fires, the vast majority of which are preventable and most of them due to gross carelessness.

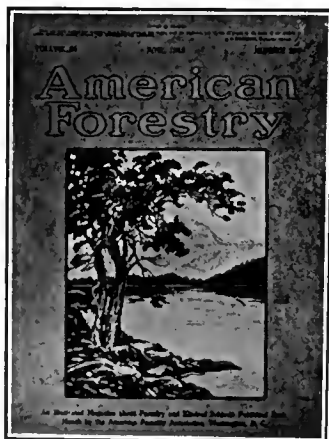
SUSPENSION BRIDGE TO BE BUILT

TO permit tourist travel by means of animal transportation from the south to the north rim in Grand Canyon National Park, Arizona, the National Park Service, of the Department of the Interior, is to build a suspension bridge across the Colorado River. The north side of the park, or the north rim as it is called, is today practically unvisited, owing to the difficulties attendant to getting horses or mules across the Colorado. Those who have made the long journey from railroad points in Utah have been tremendously impressed with the scenic grandeur of the north rim. It is about 1,500 feet higher in altitude than the south rim, and the great chasm viewed from this side reveals a new and alluring aspect. With the construction of the suspension bridge, rim-to-rim travel is destined to become one of the most fascinating of park trail trips.

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ATTENTION, FORESTERS

AMERICAN FORESTRY will print, free of charge in this column, advertisements of foresters wanting positions, or of persons having employment to offer foresters. This privilege is also extended to 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.

POSITIONS WANTED

YOUNG MAN, 36, single, technical trained and practical experience in forestry, tree surgery, landscaping and orchard care, wants to get in business for himself as city forester in an excellent location anywhere in the United States. Will also consider position as forester on large estate. Employed at present and best of references. Address Box 2065, care AMERICAN FORESTRY Magazine, Washington, D. C.

POSITION WANTED by young graduate forester. Six years practical field work in forestry and lumbering. Am now employed but desire change. Box 2075, care AMERICAN FORESTRY, Washington, D. C. (4-7-21)

FORESTRY GRADUATE, age 30, several years experience in forest work, including city forester, landscape development, portable logging reforestation, knowledge and experience in farming and farm machinery. At present employed along technical and administrative lines. Will be open near future for responsible position, preferably in development and management of private forest or estate. Box 2070, care AMERICAN FORESTRY Magazine, Washington, D. C. (4-7-21)

YOUNG MAN with master's degree in forestry and who also has had experience in city forestry, tree surgery, and esthetic forest planting desires a position in any phase of forestry—logging, lumbering, forest management, or city and esthetic forestry—where marked ability will bring advancement. Would also consider a position as part time instructor in botany, the remaining time as city forester. Have taught botany while a graduate student in one of the foremost universities in America. An ex-officer of the World War. Address Box 2080, care AMERICAN FORESTRY MAGAZINE, Washington, D. C. (4-6-21)

POSITION WANTED by graduate forester, veteran 10th Engineers, at present lumber inspector Pennsylvania System, experience in French forests, Southern Pine and Northern Hardwoods. Desires position as forester for private estate or other work. North preferred. Address Box 2085, care AMERICAN FORESTRY MAGAZINE, Washington, D. C. (4-6-21)

POSITION WANTED BY FORESTER. A healthy United States citizen, 36 years old, actively engaged in logging in equatorial America, where he has done considerable practical and scientific pioneer work, now wants to return to work under more civilized and progressive conditions. Has 12 years' bush and mill experience. He works best where difficulties and problems are greatest. He is a practical enthusiast for constructive and reconstructive forestry, and desires to make connection with a body recognizing said qualities. Address Box 2090, care of American Forestry Magazine, Washington, D. C. (6-8-21).

EX-SERVICE MAN wishes employment with some Forest Construction Concern or Irrigation Company which can use a young man who is a Technical High School Graduate, and who is a Mechanical Draftsman with some slight knowledge of plane surveying. Willing to work and can do same. Address Box 2095, AMERICAN FORESTRY MAGAZINE, Washington, D. C. (6-8-21)

CAN YOU USE ABILITY.—Young man, technically trained with master's degree in forestry desires position of responsibility with some lumber or forest products company. Fifteen months experience. Address Box 212, Lockhart, Alabama. (8-10-21).

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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PAPER FROM SOUTHERN PINE AND RED GUM

THE possibility of using southern pine and red gum for the production of high grade book and magazine paper has been demonstrated in recent tests at the United States Forest Products Laboratory, Madison, Wisconsin. The experiments indicate that one cord of loblolly pine and one of red gum are together capable of yielding one ton of paper, at a cost which would allow a good profit under prevailing conditions. The utilization of southern pine for this purpose would also spread the burden of the pulpwood supply over considerable territory which has a large annual growth of timber. Book paper requires for its manufacture two kinds of wood, a long-fibered wood, such as spruce, to impart strength, and some short-fibered hardwood to give the formation, finish, and other printing qualities. The southern pines are long-fibered woods, excellently suited for the manufacture of wrapping paper and fiber board, but their pitch content and the difficulty of bleaching them have heretofore been obstacles in the way of their use for white paper. These obstacles, it has been shown, can be overcome in a large measure by proper cooking conditions and improved bleaching methods. Red gum is typical of many southern hardwoods that might be used with the pines for the manufacture of the better grades of printing paper.

PENNSYLVANIA'S FIRE TOWERS

Major R. Y. Stuart, Deputy Commissioner of Forestry, has announced that twenty-five sites have been definitely fixed for forest fire observation towers that will be erected by the Department of Forestry this summer. Orders for fifty towers have been placed with the manufacturers. The remaining locations will be selected by George H. Wirt, Chief Forest Fire Warden, within the next few weeks.

The Department of Forestry is planning to build 168 miles of new roads and 278 miles of trails in State Forests this year. These roads and trails will enable foresters to reach fires more quickly.

LASHES OF WOODCHUCK SKINS

THE following interesting letter from Dr. Robert T. Morris, of New York, to Dr. R. W. Shufeldt, contributing editor to AMERICAN FORESTRY, is reproduced in full:

"In your interesting article on the subject of woodchucks and porcupines in the current number of AMERICAN FORESTRY, I note the statement that you have not known of woodchuck skins being collected for the purpose of making whip lashes. When I was a boy all of the farmers in the vicinity of our family farm in Newtown, Connecticut, used woodchuck skins in this way. The skins were put in a thick mixture of wood ashes and water until the hair could be brushed off. They were then treated in

two different ways by different farmers. Some of them rubbed alum into the skin and worked it between the hands every day until it was soft and pliant. Others put it in a thick mixture of dried sumac leaves and water.

"A good deal of skill was used in going around this skin with a knife in such a way as to cut it into a long strip. The strip cut in many circles in this way was straightened out by fastening one end of it to a limb of a tree and tying a stone to the other end, leaving it there for several days. The leather meantime being oiled occasionally.

"The strips of woodchuck skin cured in this way were used for the long whip lashes for driving oxen, for flail strings, for harness lacings, and other leather string purposes. Elskins were sometimes put in along with the woodchuck skins in the original preparation and were then used for flail strings and for string lashings of various sorts."

REDWOOD GROVE PRESERVED AS MEMORIAL

A BEAUTIFUL grove of redwood (*Sequoia sempervirens*) has been dedicated as a memorial to Colonel Raynal C. Bolling, of the United States Air Service, first American officer of high rank to give his life in the World War. Dr. J. C. Phillips, of Wenham, Massachusetts, brother-in-law of Colonel Bolling, has established the Bolling Memorial Redwood Grove on the South Fork of the Eel River in Humboldt County, California.

The grove has been purchased by Dr. Phillips and a deed will be given to the Save the Redwoods League. It will be held by the League until it is made public property and assured of being preserved for the generations to come.

A memorial tablet to Colonel Bolling will be placed near the highway at the entrance to the grove.

BALSA WOOD LIGHTER THAN CORK

BALSA wood, growing notably in Costa Rica and Ecuador, is the lightest wood known, weighing only 7.3 pounds to the cubic foot. Cork weighs 13.7 pounds. Growing more rapidly than almost any other known tree, it is said that within four years a balsa tree will attain the height of 30 feet, with a diameter of ten inches. It is as durable as cedar. The wood is white, extremely straight grained and easy to work. It is soft when green, but seems to harden later. It is used extensively for making life rafts and life preservers, and it is thought that it will eventually constitute a valuable source of pulpwood. A brown-colored cotton-wool, commonly used for stuffing pillows and mattresses, is also produced. It is believed that the tree would flourish in Florida, and because of its rapid growth would spread rapidly over the southern part of the State.

WOODEN DOORS DATING BACK TO MIDDLE AGES.

AMONG the famous doors of history are the carved wooden doors of the church of Santa Sabina, Rome, depicting in relief, scenes from the Old and New Testament. These are one of the most remarkable examples of early Christian sculpture extant.

In the earliest times, as in Babylon, doors swung on sockets instead of hinges. In Roman days wooden doors were decorated with bronze and inlaid, and throughout the Middle Ages richly carved doors of wood adorned the churches. In the Gothic period, wooden doors were decorated with wrought iron hinges which were often elaborated into intricate ornamentation, covering a large part of the door. The doors of the cathedral of Notre Dame in Paris of the Thirteenth Century, are the finest examples of this class. During the Renaissance in Germany and France, elaborately carved doors were among the most beautiful products of wood sculpture.

Some of the old English doors were formed of narrow planks placed side by side, and in dwelling houses generally, in the Middle Ages, the doors were small and fairly simple, meant for strictly practicable purposes and often provided with some means of defense. The doors of the Norman period were round-headed, while with the 13th century came the doorway with the pointed arch and later the flattened arch.

In the case of interior doors, splendid old polished mahogany doors were important features in some old English homes and there were old oak doors of wonderful beauty, especially when found in oak paneled rooms.

Haphazard selection of doors of the ready-made variety should not be allowed in the building of a fine home, but the doors should be designed by the architect who builds the structure that they may be in keeping with the general style of the house. Upon the attractiveness and distinction of the door and doorway depends the visitor's first impression of the home he is about to enter.

THE "FORD" FOREST

THE properties of Henry Ford have expanded to take in a railroad, a mine and a forest. Now timber from virgin forests of the Upper Peninsula of Michigan will be used to furnish lumber for Ford automobile bodies and other requirements. Another link added to the chain of Ford industries is the Ford sawmill, located just outside of Detroit. Thus this great manufacturer protects his interests by gradually becoming less and less dependent upon outside sources of supply through the acquisition of valuable resources within his own organization.

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The thing he used.
To work with was.
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It was the nose.
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SPLIT POSTS AND ROUND POSTS

IS a split fence post as durable as a round fence post? This is a question frequently asked of the U. S. Forest Products Laboratory. The fact is, one kind of post will last about as long as the other if the amount of heartwood is the same in both says the Laboratory. But if the percentage of sapwood is increased by splitting, the split post will be less durable, and if the percentage of heartwood is increased, it will be more durable than a round one. Posts of spruce, hemlock, or any of the true firs are exceptions to this

rule, because their heartwood and sapwood are about equally durable.

When posts are to be treated with creosote or other preservative, a round post is preferable to a split post, because of the comparative ease with which the sapwood can be treated. The heart faces on split posts do not, as a rule, absorb preservative well. Split red-oak posts will take treatment, because the wood is very porous, but the heart faces of split posts of many other species, notably white oak, red gum, and Douglas fir, resist the penetration of preservative, even under heavy pressures.



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A "COLUMN CONDUCTOR" ON FORESTRY

Editor's Note:—The following article is by Don Marquis, one of the most widely known "column conductor's" in the country and his daily column in the New York Sun is widely read and quoted.

THE ALMOST PERFECT STATE

In the Almost Perfect State no man shall be allowed to cut down a tree unless he plants at least two.

The pig that lies down in the trough wastes half of his own swill. Greed is always stupid. The wanton destruction of the national resources in this country must be paid for not only by this generation, but by the next one and the next one after that.

Formerly in thoughtlessness, and now in a callous disregard of the prosperity of millions living and of millions yet to be born, the timber owners of America have wasted and are wasting one of the most splendid gifts of nature—in their blind haste for the immediate dollar, cheating themselves, cheating their neighbors and cheating posterity.

A gift of nature, we say... but in reality nature has her prices, too. The earth will work in partnership with humanity and cheerfully render up her increases, but likewise the earth demands fair treatment. The soil not only gives, but it exacts, and in the large economy of continents and worlds the scales and balances are nice to the weight of an ounce of potash. Let a tribe cheat the earth... coin its rainfall and its heat and its wind into dollars beyond present need and reason, use up within this decade all the nitrates the soil was putting into a savings bank for future generations, always taking and giving nothing in return, always reaping and never sowing... and the earth will take a vengeance upon that tribe: choke the streams and overlay the valleys with sand, and then sulk for a century or so in sullen infertility.

Unscientific lumbering not only has destroyed millions in present wealth and future wealth of timber alone, but it has done a more comprehensive work of ruin than that. It makes deserts. Deserts of the slopes upon which the trees stood, and deserts of all the surrounding lands dependent upon the forest reserves of water for their vegetation and for the rejuvenation of the soil.

A forest not only attracts rainfall, but it conserves it; the roots of the trees and of the underbrush hold it in the ground, and through the springs and creeks it is slowly distributed to the adjacent plains and valleys. But with the forest gone the rainfall passes off at once in freshets; there is a season of flood and a season of drought; the floods carry the arable soil into the creeks and rivers; where vegetation was, there is Sahara;

where the streams were navigable they are choked with dirt; where there was water power, there are winding beds of sand.

And as vegetation declines throughout a region the rainfall which was attracted by that vegetation, and withheld in its intricate nets, more and more withdraws. The climate changes. Drought becomes permanent. And so we have millions of acres laid waste through the greed or ignorance of the timber slashers who killed five growing trees to reach one grown one because it seemed more profitable at the moment to lumber in that fashion. Was it not their own land; had they not bought that timber? Why, yes—the next generation be damned, and to Gehenna with the surrounding country.

And the next generation is damned with poverty, and the surrounding country does become a sort of arid Gehenna. For the earth takes at their word and in their spirit the tribes that crawl and chatter upon its shaggy flanks, and the foolishness of the fathers is visited upon the sons even beyond the third and fourth generations.

However merciful Heaven may be, this earth swings onward in a humor that is roughly and grimly just, and the clans that are not honest with it are crushed beneath the vast, impersonal revenges of its going.

The Government of the Almost Perfect State will be based upon a study of the earth itself, and its moods and spirit.

DON MARQUIS.

LUMBER PRODUCTION IN AUSTRIA

WITH the best success, little can be expected in less than five years by the Austrian government in its work of reconstructing the lumber industry of that country, reports the United States Trade Commission in Vienna. The potential production of lumber of present Austria is estimated from 141,240,000 cubic feet to 176,550,000 cubic feet annually. To realize this amount the entire industry must be constructed from the beginning; railways must be built, cable railways erected, trucks purchased, sawmills secured and installed, camps fitted up and roads laid. The Austrian government is planning to push through the work in spite of all difficulties.

Prior to 1914, the production and export of softwoods constituted one of the leading Austrian industries and importation was necessary only in the case of rare woods for special purposes and hardwoods from America for furniture. Lumber exports from Austria are today practically at a standstill.

PLEASANT THINGS SAID TO THE EDITOR

"You have a corking fine issue this month (May). I was very much interested in the editorials."

WARREN B. BULLOCK.

"Am mightily interested in the article on reclaiming land in Tennessee and Mississippi by planting black walnut. This is fine work, and THE TIMBERMAN wishes to compliment you on your efforts in behalf of forest conservation."

GEORGE M. CORNWALL.

"The American Forestry Magazine seems more interesting each issue. The entire family looks forward to its coming. Your nature study articles are enjoyed by the children also."

JULIUS TISCH.

"I cannot begin to tell you how thoroughly I have enjoyed the AMERICAN FORESTRY magazine which I took last year and the interest which was manifested in its contents by our literary club. I sincerely regard it as one of the best magazines before the public today."

MISS GERTRUDE BLACK.

"I am impressed by such an excellent magazine as you are publishing and by what it can do toward educating the public along the lines you are engaged in."

THOMAS A. McBETH.

"I enjoy reading the magazine. The April number was an especially good one."

F. O. GRAVES.

"It is interesting to me to see how many business men are becoming interested in the entire forestry problem. I am sure that the forward movement during the next ten years is going to be a far-reaching one. The April number of the magazine was admirable."

J. W. TOUMEY,
Dean of Yale Forest School.

"We have struck a high mark in the April number and I hope that we can continue to keep up the same speed."

ARTHUR H. CARHART.

"I enjoy AMERICAN FORESTRY very much and get much useful information from it."

J. M. WILLIAM.

"I have read Dr. Shufeldt's article on line in ponds and marshes in the May number with the very greatest interest."

PROF. ELMER LOUIS KAYSER.

"If there is anything I can do in spare time to further your campaign, our campaign, I am more than ready to do it. Any campaign for vitally important legislation should be based on the stirring up of public interest and educating the public. Lack of public interest is the explanation of the disappearance of our forests and our wild life."

COL. J. N. MUNRO.

"I am very much interested in the Association and I am pleased to note that all interests are now agreed upon a form of national and State legislation which will save a great part of our forests from being destroyed. I wish you every success in your laudable undertaking."

H. J. GREGG.

"I am enjoying AMERICAN FORESTRY very much indeed."

MRS. WM. M. GEARHART.

"A splendid magazine."

MRS. L. H. HERBERT.

"I have been an interested reader of the AMERICAN FORESTRY MAGAZINE for at least ten years, and along with my connection with the Trexler Lumber Company it has helped me wonderfully."

HOWARD F. ADAMS.

"I wish to renew my subscription to your valued magazine. I enjoy reading it very much and look forward every month to its appearance."

D. H. KATZ.

"Your magazine is a most wonderful and interesting one. I have been a member since it started, I think, around twenty years ago, and it has always been very interesting to me."

ALFRED J. KULL.

"We enjoy AMERICAN FORESTRY very much and feel that it contributes greatly to the conservation of our forests and a general beautifying of America by tree planting."

MRS. RUTH DAY.

"Your letter telling of the prospect of legislation that will preserve our forests so they will supply our future needs is the pleasantest piece of news I have received for a long time in this most trying time in the world's history."

MARY D. HUSSEY.

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ONE MILLION CORDS OF ALASKA PULPWOOD SOLD.

One million cords of pulpwood on the Tongass National Forest, Alaska, has just been sold by the Forest Service of the United States Department of Agriculture to the Alaskan-American Paper Corporation. The timber is located along the east shore of the Behm Canal, Revillagigedo Island, about 32 miles from Ketchikan, the largest city in the Territory. The contract price of the timber was 60 cents per 100 cubic feet for spruce and cedar, and 30 cents per 100 cubic feet for all other species. The sale area covers 45,000 acres and extends for 55 miles along the coast. Twenty per cent of the forest is spruce, 66 per cent hemlock, and 14 per cent Alaska and western red cedar.

The Alaska forests also contain the second chief essential of the pulp and paper manufacturing industry, namely, water power. No accurate survey of the power resources has yet been made, but known projects have a possible development of over 100,000 h. p., and it is believed that a complete exploration of the National Forests in southern Alaska will show not less than 250,000 potential horse power that can be developed from water.

Forest Service cruisers are now working in Alaska collecting data for further use and development of the forests. One block of timber containing 335,000,000 cubic feet—enough to keep a 100-ton pulp mill running, has been advertised and is now ready for sale.

CONTROLLING DAMPING-OFF

The best method for controlling damping-off in forest nursery stock appears to be the disinfectant treatment of the seed bed, say specialists of the United States Department of Agriculture, who have recently completed a series of investigations to work out control measures. A report of their investigations has just been published as Department Bulletin 934, Damping-Off in Forest Nurseries. Sulphuric acid, they say, has been found very useful for conifers, as they are apparently especially tolerant of acid treatment.

In most nurseries, if the minimum effective quantity of acid is used, there is no need of any special precautions to prevent injury to the seedlings. The minimum quantity must be determined for each locality, for the specialists say that no single treatment can be found that can be universally applied without change in details.

The most serious losses in conifers, according to the bulletin, are from the root-rot type of damping-off, which occurs after the seedlings appear above the ground. This type of the disease is most serious under extremely moist atmospheric conditions. The type of damping-off which appears later when the stems become too rigid to decay easily is ordinarily less important than the earlier type. Seedlings more than two months old are, as a rule, able to recover from infections. The specialists believe that thick sowing favors the disease, and that soil acidity is in general unfavorable to it.

WOMEN HELP IN FIGHTING FIRES

WOMEN helped in the hazardous game of fire-fighting during the past season in the Southwest, according to the forest officers of several of the Arizona and New Mexico forests. Some were stationed on the lookout towers of lonely high peaks, others working remote forest telephone exchanges through many hours when the danger was acute, and others on the very fire line itself, leading or fighting the fires with the hastily assembled crews. Forest fire fighting has generally been conceded a full sized man's job, but the long annals of the Forest Service throughout the West are filled with stories of women taking a helping hand at the various phases of the game. This past season in the Southwest was no exception.

On the Rincon Mountains, a part of the Coronado Forest in Southern Arizona, the high Spud Rock Lookout point was "manned" during the fire season by Mrs. Lyle B. Smith, wife of the local Forest Ranger. Mrs. Smith, in addition to her lookout duties, cleaned and brushed out a number of miles of trail in the vicinity of her tower.

On the Prescott Forest Miss Edith Dandrea discovered a fire near the head of Turkey Creek. She reported the fire to her father and brothers, secured the services of another man, and went with the party to the fire, taking a hand in the fight. The fire had secured a considerable start when the party arrived, and when a brisk wind came up about the middle of the afternoon it was seen that they could not control the fire. Miss Dandrea then caught up her horse and rode 15 miles in record time over rough mountain trails and roads to the nearest telephone in Crook's Canyon and notified the Forest Ranger of the district. Later the fire was put under control. The Forest Supervisor reported that the prompt action and work of this woman prevented a large fire and saved a big area of young and mature yellow pine, which the fire would shortly have destroyed.

ADDITION TO EASTERN NATIONAL FORESTS

The purchase of 42,221 acres of land in 101 different tracts in the White Mountains, Southern Appalachians and Arkansas, at an average price of \$4 an acre, was authorized by the National Forest Reservation Commission on June 15. The tracts are located in Alabama, Arkansas, Georgia, New Hampshire, North Carolina, Tennessee, Virginia and West Virginia.

The commission also authorized the examination of lands in Kentucky with a view to determining their suitability for the establishment of a National Forest in that State. Investigation will be made of lands outside the Appalachians with the object of ascertaining the protection afforded the flow of navigable streams by forest cover.

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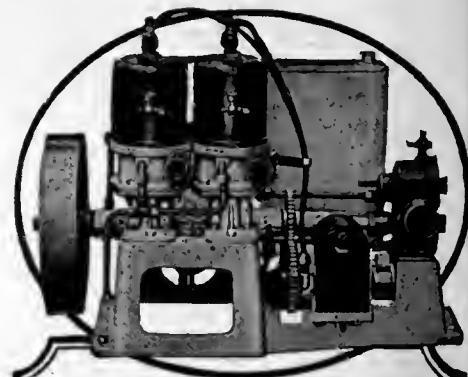
SPECIAL investigations to find out how far the various bird species aid mankind in his perpetual war on insect enemies are being carried on by the Bureau of Biological Survey, United States Department of Agriculture. In the western States the grasshopper is particularly troublesome, so far as the farmer and the ranch owner are concerned. Specialists found that of 27 species of birds examined 25 were grasshopper eaters. In 19 of the species all of the individuals collected had given grasshoppers place on their menu. The birds having the best records were the lark sparrows, meadowlarks, Franklin gulls, Arkansas kingbird, crow blackbird, and the common kingbird.

Probably there are not enough birds in the country to clean up a full-strength invasion of grasshoppers such as the western farmers have come to dread, it is said, but the birds assist materially in the efforts made by man to control the pest.

Specialists say that poisoning campaigns are among the best weapons used against the grasshopper. From time to time reports are sent in, saying that many birds have fallen victim to the poisoned mixtures placed for the insects. Such charges were associated with the gypsy moth spraying campaign in New England and with the laying of poisoned meshes for cutworms and other insects. Careful observation, made by experts, shows that the bird losses from such causes are insignificant. Some birds, it is said, are not harmed at all by the presence of poison placed for insects or vermin; the quail in California were not harmed by the baits that were set out to kill ground squirrels—though the campaign was a general one and was conducted with much intensity. In the Dakotas a few birds succumbed to the arsenic meshes placed for grasshoppers, but the number killed was so slight as to be of no consequence, it is said.

HOW SQUIRRELS PLANT WALNUT

The fence-rail forester seems to have the needs of the black walnut in his mind when he goes about his work. As a sapling this species cannot endure much shade; if it is to survive it must be planted in rich soil, where the sunlight will fall upon it. The squirrel has set out whole groves by burying the nuts in the open areas at the forest edges, and also many single trees by planting in the fence corners. Why he buries the nuts is evident enough, but why he leaves some of them to sprout and grow is not so clear. It may be that an unusually severe winter—or a hunter or an owl or something else kills the little banker before he has time to draw out his savings. An early spring may make him independent of his storage plant.



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AMERICAN FORESTRY

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"HALL OF FAME" FOR TREES

THE WESLEY OAK

THE Wesley Oak, on St. Simon's Island, off the coast of Georgia, is one of the trees of America which well deserves a place in the "Hall of Fame" of historical trees, for which it has been nominated by Mrs. Mary M. North, of Herndon, Virginia, and Joseph P. Jay, Editor of the "Christian Advocate."

Among the noble oaks of the country there is not one more beautiful nor more symmetrical in its spread of branches. Additional interest to the sightseer and traveler is its drapery of Spanish moss, which covers it like a veil festooned from royal, towering crown to well-anchored trunk, and finally sweeping the friendly ground which sustains it and drinks in the gentle showers or beating rains which fall through the wide spreading branches of the great tree. Behind this aged, yet ever young tree, and under some of its sheltering branches, is an Episcopal church, while only a short distance away is the orphan-

age of the church. Our country was very young when this oak, which was destined to become famous, was used as a sanctuary by the preacher, who was of the Wesley family, a clergyman of the Church of England, and the son of a clergyman, but who was protesting against some of the usages rife in church quarters at that time. When the brothers, John and Charles, came to America, they were still in the An-

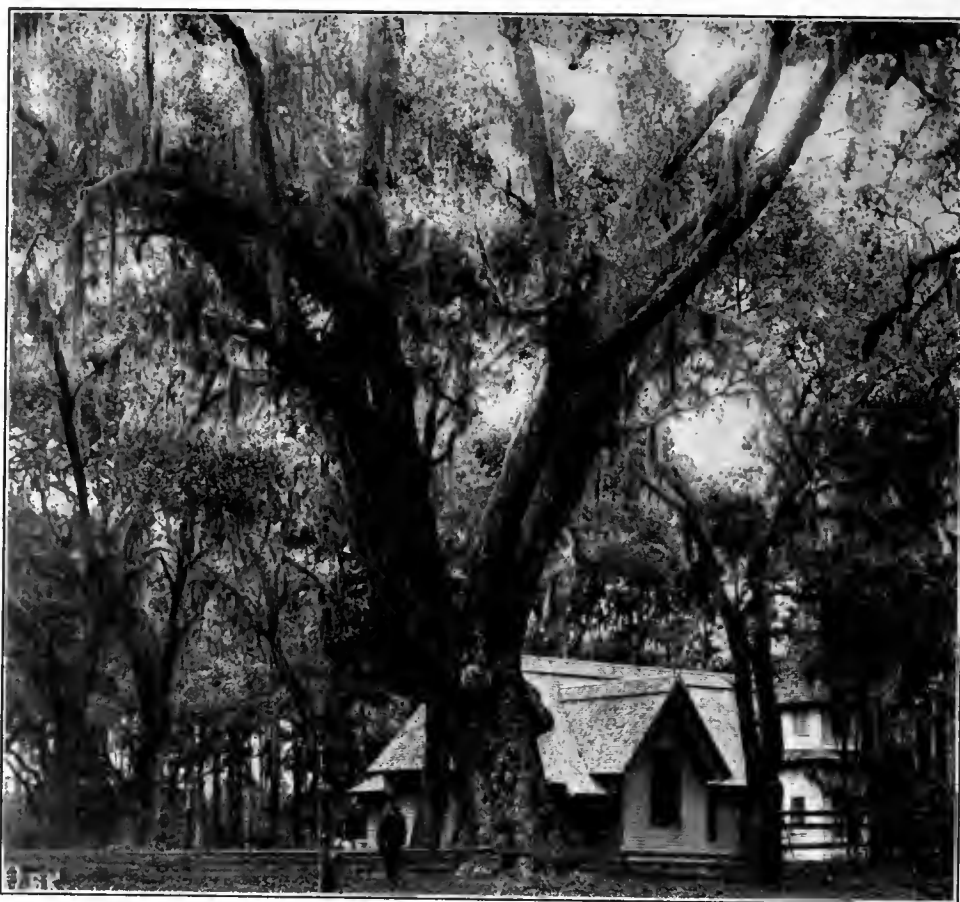
glican Church. Both John and Charles preached under this oak to the British soldiers who were quartered upon St. Simon's Island.

During the early part of the last century the remains of the old platform which the preachers used for a pulpit were still standing. The tradition of that section records that in the early days there was a fort at Fredericka, where the British made a stand against the Spanish, and some of the cannon are there yet. It was to the men in that fort that the Wesleys preached, as

well as to others. John Wesley also preached in a church in Savannah and had a Sabbath school in that place, his brother Charles, the hymn writer, being with him. The two graduates of Oxford, England, came to this country by the invitation of Governor Oglethorpe, of Georgia, who founded Savannah.

No minister was there at that time, and the Governor desired the Wesleys

to preach in the young, but growing, country, so they accepted the invitation. John Wesley, a Methodist in practice and belief, but a priest in the Anglican Church, preached his first sermon in America in 1736 and remained in this country until 1737, when he returned to England. There he continued the great work which has made his name famous and familiar both in America and over the world.



THE WESLEY OAK

AMERICAN FORESTRY

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NO. 333

THE PRESENT AND PROSPECTIVE IN FORESTRY

BY FILIBERT ROTH, DEAN OF FORESTRY, UNIVERSITY OF MICHIGAN

FORTY years ago Sargent in the 10th Census told the people of the Lake Region that if they continued to cut and burn as they were doing then, they would soon be at the end of their pine supplies and have a denuded waste. The lumber papers thought it a joke and invented the term of "denudatics"; the lumbermen and even their

and over 10 million acres, or nearly a third of the State land is unused waste land producing nothing to speak of. As early as 1911 Michigan imported over 500 million feet of lumber for its industries. It cost about 13 million dollars. Easily three millions was in extra price and another three millions to haul it into the State. The out-



THIS LAND WAS LUMBERED TWENTY YEARS AGO

This cut-over area once had a fine stand of white pine and Norway pine; but when this was cut off the land was neglected and fires killed the young growth and the land which might have been growing another crop of timber is now absolutely non-productive.

cruisers were sure of "inexhaustible" supplies; the local press in the pinery towns scolded any man and any articles calling attention to Sargent's statement; and the legislatures, naturally paid not a particle of attention to the outlook for the second largest industry. Even the friends of the forest, the little handful of enthusiasts who neither owned timber nor sold lumber, could hardly grasp the situation; "Oh, we shall cut closer, use smaller timber, use steel and cement and the supply will last a considerable time beyond Sargent's estimate."

But Sargent was right, his forecasts have come true; Michigan today does not cut the one-hundredth part as much pine, and cuts mere rubbish compared to the White Pine of those days. Michigan forests are destroyed; the land is denuded; the lands are not settled;

look is this and the estimate safe; during the next 100 years Michigan is going to spend 500 million dollars paying fancy prices and profits, and another 500 million dollars in freight rates to get lumber. And prices will be such that neither people, nor their crops will be satisfactorily housed from now on. We are told that the farm home is 50 per cent under-built; the outlook is that it will stay right there and even get worse; no "whooping" and "boosting" and orating of "back to the land" is going to change this by one hair.

The Capper Report printed last year is the last word on the forestry situation for our country; it is amply correct, and probably as correct as any we shall ever have. The Capper Report tells us some astonishing facts; our virgin forests are cut to about 1-5 of their former area.

Two-thirds of our virgin forests are west of the great Plains and with this goes the alarming fact that nearly 78 per cent of our merchantable softwoods, or about half of all our lumber, is out there and will cost \$15.00 per M ft. b. m. just to haul to Chicago. It is more than mere rumor that says that a good deal of this timber comes to Pennsylvania and goes clear to Massachusetts in spite of the freight, and that much of our lumber costs the retailer today as much for freight as it does for lumber. But \$15.00 per M ft. is a big sum; for this price foresters in the old world can raise it; and we in Michigan could do the same and make our 10 million acres of waste land bring in some 30 to 40 million dollars per year besides making our North Country one of the finest recreation districts in the world. Fifteen dollars used to be fair pay for a thousand feet and now, and from now on it goes in merely for extra haul.

The Capper Report tells us that we still use some 25 billion cubic feet of timber per year; that we burn up about one billion cubic feet and incidentally cut and use more lumber than the rest of the world all put together. Colbert said: "France will perish for lack of timber;" we always said: "The United States prospers because it has all the good timber it can use." What we want is to have our children also prosper, and not turn over to them a devastated forest waste, an empty mine, plenty of taxes and a foolish appetite for luxury.

The Capper Report says that we use and waste about 26 billion cubic feet and that we grow about six billion feet. Our growth in volume, then is less than one-fourth our use, and in value or dollars it is not one-eighth. How long can we keep up this losing business? Not long. The standing supplies are estimated at 745 billion cubic feet. If high prices keep cutting down our homebuilding, so that we use less in the future in spite of a growing population and even if we reduce from 25 billion of use to 20 billion, we shall use 400 billions every 20 years and by 1960 we shall be down to 15 years' consumption and in a truly serious condition as regards the timber business, the housing problem and particularly agriculture.

What shall we do about it? Why not turn to the Old World where the different people have worked on this problem for centuries and have solved it quite to their satisfaction?

We naturally turn to France as the cradle of forestry and forest legislation. There, after centuries of forestry (and some of it most excellent), the famous minister Colbert said in 1660: "France will perish for lack of timber;" and Raux today (1919) condemns undue liberty in cutting timber and advocates that all cutting be marked by properly prepared foresters.

In France King Philippe de Valois in 1346, or nearly six centuries ago, passed a law demanding the *sustained yield*; a law which required every forest owner to keep



THIS FOREST HAS BEEN CUT BY FORESTRY METHODS

An indication of proper cutting of a forest is this illustration of a timber sale cutting in the Big Horn National Forest, Wyoming, where the trees which are to be felled are marked by the foresters and the brush collected and piled to minimize danger of a fire.



WHERE THE FOREST HAS BEEN PROPERLY CUT

Note how the brush has been piled for burning or removal in order to prevent forest fires, how cordwood has been stacked and how sufficient seed trees have been left to develop a new growth.

constantly a body of growing timber on the land. Thirty years later Charles V. strengthened the forest laws by one of 52 articles, and in this law again emphasizes the simple fact: "The cut must not take more than the growth."

Various laws followed, but, in keeping with affairs of those times, things became lax, and in 1669 Colbert issued his "Ordonnance," the most quoted forest law ever promulgated, after seven years of work by a select commission of over twenty men. Of this law the French forest authority Huffel in 1907 says: "This law of 1669 is primarily a law of *organization* and *control*;" and he also states emphatically that it did not order or forbid any particular method of silviculture.

In the main the law required all cutting of the timber to be done according to a definite plan, approved by proper authority. The Revolution somewhat upset things; but the leaders promptly realized their mistakes; the law of 1827 practically returned France to the law of 1669 and an effort to change in 1888 was rejected. And the result is that France has plenty of good timber, even if not as much and as good as the good foresters Raux and others think she should have.

The little Republic of Switzerland, dating back 600 years with an area little over a third of Pennsylvania and about three million people tilling less than 20 per cent of the land, has had a most instructive experience in forestry.

It is here where King Ludwig of France gave his

daughter Hildegard, Abbess of Zurich, the famous Sihl forest as early as the year 853, and where the city has owned this forest over 1,000 years and has it today in just as fine a condition as ever before, after cutting a yearly crop of timber for over ten centuries.

But Switzerland is a Union of 22 Cantons or very independent states; the "Kantonli Geist" is a full equal of our "States Rights" spirit; it has poor mountain districts as well as industrial towns; in short it combines as wide a range of conditions as our country and its development of forestry and is therefore most interesting.

Forestry in the Canton of Zurich, with its famous city forest, was of the best for centuries; forestry in the mountain districts with people largely dependent on their few goats and cattle was of the poorest; Switzerland imported firewood and timber. The forests belonged largely to the villages and towns; the Union owned about 5 per cent, and the villages claimed authority; and opposition to change was strong. Like with us forestry education by forest associations set to work and the constitution was amended, and in 1876 the National Government assumed authority over all forests in the mountains, passed a law in which three things stand out:

- (1) The forests must not be divided in areas, or broken up by sales.
- (2) The volume of the cut must be prescribed and the cut follow a plan, which maintains a growing stock of trees.

(3) All areas cut must promptly be restocked.

In 1897 the Constitution was again amended; the Union Government was given more authority this time over *all* forests and waters; the law of 1902 was adopted by referendum vote of the people in 1903. Article 31 of this law declares:

"The forest areas of Switzerland must not be diminished."

The principal points in the law are:

(1) The cut of timber must be a sustained cut, the growing stock on the land must be maintained in volume and quality according to an approved plan.

(2) Partition and sale of village, town, etc., forest is forbidden.

(3) The private owner can demand that his forest be bought by the government if he feels unable to manage it properly.

There is no effort at any teaching or prescribing in matter of silviculture, it is simply a matter of maintaining the forest in *area*, and in its *cover* of growing trees.

Fortunately for both France and Switzerland

the forests were not owned by a half nomadic lumber industry, in badly distributed tracts, but were largely in well rounded properties and in long lived ownership of old families, villages and towns or else of State.

And now what shall we do with our forests in the United States? Why not copy from the Old World, especially in a matter like forests, where any measure, to be of value, must go on for a century? In principle the case is simple: there is nothing difficult or mysterious about it

anywhere, it is a case of good will and good intentions. Just as in farming, in road building, in education and other necessary enterprises of the people, all countries come to about the same plans and all plans must use methods simple enough to apply, and effective enough to accomplish the task. In the United States as in Europe the two great points in forestry are:

Keep enough land area in forest.

Keep every acre covered with growing timber.

In the United States the task is threefold:

(1) Regulate the cut on all the forests we still have.

(2) Improve the growing stock of timber on the better cut over lands.

(3) Plant up the 80 million acres of waste



AN EUROPEAN SECOND-GROWTH FOREST

This forest of Norway spruce in Austria-Hungary has now reached middle age, and shows what kind of second-growth forest the United States might have had on land which is now desolate had it been cared for properly.

land where devastation is complete and nature refuses to restore the growth. Of these three tasks number one is the most important and urgent; if this is neglected a tim-

(Continued on Page 574)

THE PINES OF THE SOUTH

BY J. S. ILLICK

THE South is the home of the Yellow Pines. They produce enormous quantities of the most useful wood that grows in America. More than one-third of all the lumber cut annually in the United States is produced by the Yellow or Hard Pines of the South. Southern yellow pine is often called the wood of a thousand uses. It may not have exactly a thousand uses, but it is so intimately associated with our daily life that it would be difficult for us to get along without it. We use not only the lumber of the Southern pines, but also large quantities of other products derived from them, such as tar, resin, turpentine, and oil. The Southern pines comprise seven different kinds of trees. Some of them are well-known, occur over a wide range, and produce large quantities of valuable lumber, while others are little known, occur over only a restricted territory and produce only small quantities of very ordinary to inferior wood. The wood of the seven southern pines grades into each other so freely that only three commercial kinds of southern yellow pine lumber are generally recognized, viz: 1, Longleaf Pine; 2, Shortleaf

Pine; 3, Loblolly Pine. These three kinds of southern yellow pine are the standard kinds now recognized in the general lumber trade. They are, however, not the only names used, for such other names as Georgia Pine,



A SPLENDID STAND OF LONGLEAF YELLOW PINE IN LOUISIANA

The straightness and stateliness of the stems of Longleaf Pine are among its distinctive features. Stands such as this cover extensive areas and are made up of as fine tree specimens as one can find anywhere in the country.

Yellow Pine, Southern Pine and North Carolina are also common in the lumber trade. The characteristics by which the three standard kinds of southern yellow pine wood may be recognized are not difficult to apply. They are given in the following outline: *Longleaf Pine*—1. Growth rings mostly narrow; uniform in width and outline; from 8 to 12 or more rings per inch. 2. Wood extremely heavy, hard, and very resinous; uniform reddish yellow to reddish brown. 3. Sapwood thin. *Shortleaf Pine*—1. Growth rings mostly of medium width; usually from 6 to 8 per inch. 2. Wood me-

dium in hardness and weight, and moderately resinous; whitish brown to reddish brown. 3. Sapwood variable, but usually rather thick. *Loblolly Pine*—1. Growth rings very variable but usually extremely broad; from 4 to 6 rings per inch. 2. Wood variable from hard, compact and strong to light, coarse and brashy; yellowish to red-

dish or orange brown. 3. Sapwood very thick. While the wood produced by the southern pines is grouped into only three standard kinds, it is actually produced by seven different kinds of trees. The common and scientific names of these seven trees are:

COMMON NAME	SCIENTIFIC NAME
1. Longleaf Pine	<i>Pinus palustris</i>
2. Shortleaf Pine	<i>Pinus echinata</i>
3. Loblolly Pine	<i>Pinus taeda</i>
4. Cuban Pine	<i>Pinus heterophylla</i>
5. Pond Pine	<i>Pinus serotina</i>
6. Spruce Pine	<i>Pinus glabra</i>
7. Sand Pine	<i>Pinus clausa</i>

These seven trees vary widely in their economic importance. The first three produce large quantities of wood and other forest products of high commercial value, while the last three are trees of little economic importance on account of their restricted range and small size. All of the southern pines belong to the Yellow Pine group. They are called yellow pine because of the yellowish color of their wood and bark. They are also called hard pines because their wood is very hard in comparison with the wood of such trees as white pine and sugar pine, both of which belong to the soft pine group. The wood of the southern yellow pine is famed, not only for its hardness, but also for its strength and durability. In fact, the wood has such good qualities that it is put to a wide range of uses in every part of the civilized world. The pine forests of the South have been exploited for naval stores and other forest products from the time of the first settlers, but there was no ex-

tensive development of the lumber industry until the early seventies of the last century. It was then that the yellow pines of the South were first placed upon the market on a large scale. The wood was then exceedingly low in price. This created a strong demand for it and as a natural consequence, by the early nineties southern yellow pine was leading the country in the cut of soft wood lumber.

In 1909 the production of southern yellow pine reached its peak. It then produced nearly one-half of the entire country's cut of soft woods. It is still the most important single factor in the lumber products of the United States. It furnishes about 35 per cent of the total lumber cut of the country. Experts predict that it

will remain an important factor for the next ten or fifteen years, but it is also believed that within the next eight or ten years a profound change will take place for it is very evident that its supply is being rapidly exhausted.

Each of the seven pines of the South has a number of striking distinguishing characteristics, which are present at all seasons of the year. One can find very evident differences in their leaves, cones, bark and the soil upon which they prefer to grow.



SHOWING DISTINCTIVE CHARACTERISTICS OF CONE AND LEAF

Left—(Shortleaf). The needles usually occur in twos and sometimes threes, rarely fours, and they run from two to four inches long while the cones are oval, about two inches long.

Right—(Longleaf). These needles always occur in threes, and are 9 to 15 inches long, while the cones measure from 6 to 9 inches long.

Today the area of original yellow pine forests is somewhat more than 23 million acres or a little less than one-fifth of the original area. The stand of timber upon this remaining area is about 139 billion board feet, or a little over one-fifth of the original stand.

The following simple table gives the principal characteristics of each species:

HOW TO TELL THE PINES OF THE SOUTH

NAME	LEAVES	CONES	BARK
Longleaf Pine	Occur in 3's, 9-15 inches long.	Occur near end of season's growth, 6-9 inches long.	Thin, bright, reddish-brown, rarely scaly.
Shortleaf Pine	Usually occur in 2's, sometimes 3's and occasionally 4's, 2-4 inches long.	Oval, about 2 inches long, open at maturity.	Broken in oblong plates, light reddish-brown, somewhat scaly.
Loblolly Pine	Occur in 3's, 3-7 inches long.	Oblong, 3-6 inches long, open soon after maturity.	Bright reddish-brown, broken into oblong plates.
Cuban Pine	Occur in 3's, 8-12 inches long.	Oval to conical, 3-6 inches long.	Dark reddish-brown, scaly and shallowly furrowed.
Pond Pine	Occur in 3's, 6-8 inches long.	Oval, pointed, 2-4 inches long, rarely open, persist long.	Dark brown, broken into square or roundish plates.
Spruce Pine	Occur in 2's, less than 2 inches long.	About 2 inches long; cone-scale, prickles short or wanting.	Light, reddish-brown, scaly and shallowly fissured.
Sand Pine	Occur in 2's, 3 inches or less in length.	About 3 inches long, armed with persistent spines.	Bright, reddish-brown, scaly, deeply furrowed.

The Longleaf Pine is one of the most valuable evergreen trees of the United States. What the White Pine was to the forests of the Northeast and the Lake States, the Longleaf Pine was, and in restricted areas still is, to the forests of the Coastal Plains region of the South. It occurs from Norfolk, Virginia, to the neighborhood of Tampa, Florida, and west along the coast to the Trinity River in eastern Texas. Seldom does it extend inland more than 150 miles, and in some regions its range is less than 50 miles in width. Few trees have a longer list of common names than the Longleaf Pine has. It has no less than 28 and some claim that it has 33 common names. Of all the common names, Longleaf Pine is the most appropriate, for its leaves, which range in length from 9 to 15 inches and occasionally reach 18 inches, are truly distinctive. Other common names are Pitch Pine, Turpentine Pine and Fat Pine. These

three names refer to its resinous wood. It is also called Heart Pine because of the large proportion of heartwood produced, and the hardness of its wood gave it the name of Hard Pine. Many of its common names are



A GOOD EXAMPLE OF REPRODUCTION

This is a typical reproduction area in Louisiana about fifteen years old and under conservative logging for about that length of time. The species are mixed, being longleaf, shortleaf and loblolly.

long, and often have the names of states as a prefix. Among these combination names are Long-leaved Yellow Pine, North Carolina Pitch Pine, Florida Yellow Pine, and Georgia Pitch Pine. Small plume-like branchlets covered densely with leaves and from 2 to 3 feet long, are sold for decorative purposes in northern markets at Christmas time under the name of "Florida Palm" and "Louisiana Palm." The straightness

and stateliness of the stems of Longleaf Pine are among its distinctive features. Pure stands often cover extensive areas and are made up of as fine tree specimens as one can find anywhere in the country. The attractive appearance of many trees is, however, marred by the

and stateliness of the stems of Longleaf Pine are among its distinctive features. Pure stands often cover extensive areas and are made up of as fine tree specimens as one can find anywhere in the country. The attractive appearance of many trees is, however, marred by the



BARK OF THE LONGLEAF YELLOW PINE

The stem of the Longleaf Pine is straight, tapering but slightly and it is usually free from limbs for more than one-half way to its top. The bark is thin and orange brown, separating on the surface into large, papery scales which lie flat against the trunk.

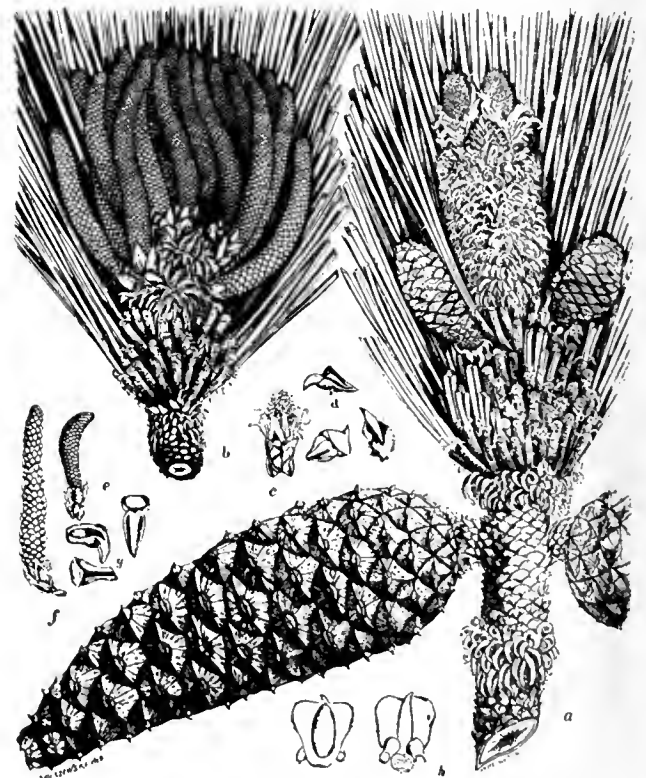
scars which they bear from resin tapping operations. The height of its stems rarely is more than 120 feet, and a diameter of $2\frac{1}{2}$ feet is seldom exceeded. Probably the average tree cut in lumbering operations does not exceed 80 feet in height and 2 feet in diameter breast-high.

Longleaf Pine is emphatically a light-demanding tree and very exacting in regard to climatic and soil factors. These exacting demands are restricting the development

of young trees, and the strong demand for its lumber is making heavy inroads on the rapidly decreasing supply of mature timber left in the forest. Unless something effective is done at once to protect the young growth and regulate the supply of the existing timber, the time is not far distant when Longleaf Pine will hold a low place in the American lumber industry and play a very subordinate role in the future practice of forestry in the South.

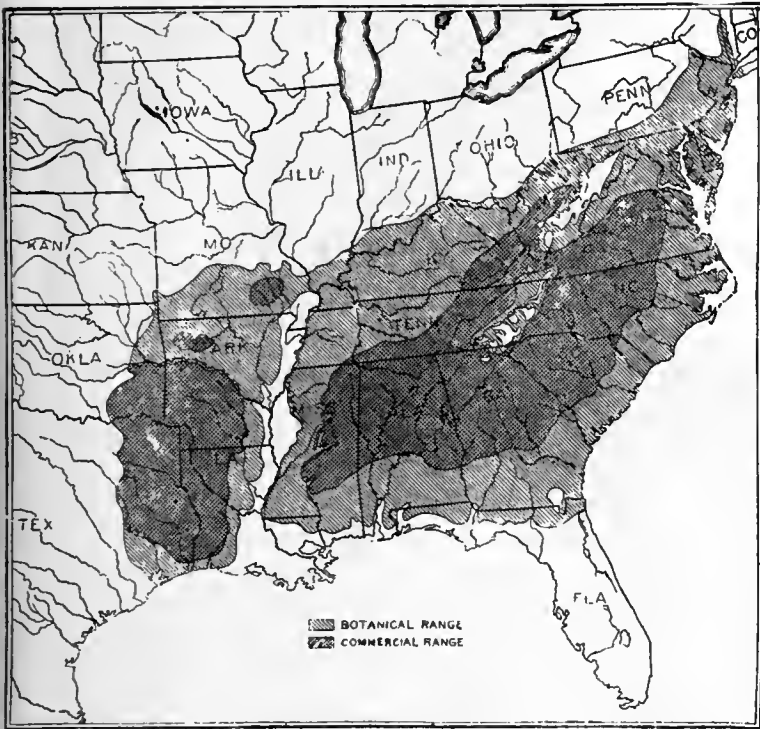
For more than two centuries Shortleaf Pine has held a prominent commercial place in the American lumber industry. It is found over an area covering more than 440,000 square miles and is of commercial importance on at least two-thirds of its natural range. Its natural range extends as far north as Western Connecticut, but near Mont Alto in Franklin County, Pennsylvania, is believed to be the most northern heavy stand of Shortleaf Pine in America. In this stand are many stately trees with trunks $2\frac{1}{2}$ feet in diameter breast-high, and clear of branches for 60 feet from the ground. These knights of the forest are covered with a distinctive armored bark, fully as typical as any grown in the South.

The Shortleaf Pine is commonest in the South, where it makes its best growth at elevation of 400 to 1,500 feet. It does, however, extend from sea level to an altitude of



FLOWERS, CONE AND NEEDLES OF THE LONGLEAF PINE

- a.—Branch with mature cones and female flowers at top, just below which are young cones of one or two season's growth.
- b.—Cluster of male or pollen-bearing flowers.
- c.—Detached female flower.
- d.—Detached young seed-bearing cone scales.
- e-f.—Detached male flowers.
- g.—Detached pollen sacks (anthers).
- h-i.—Detached very young female flowers showing two ovules at the base, which later develop into seeds.



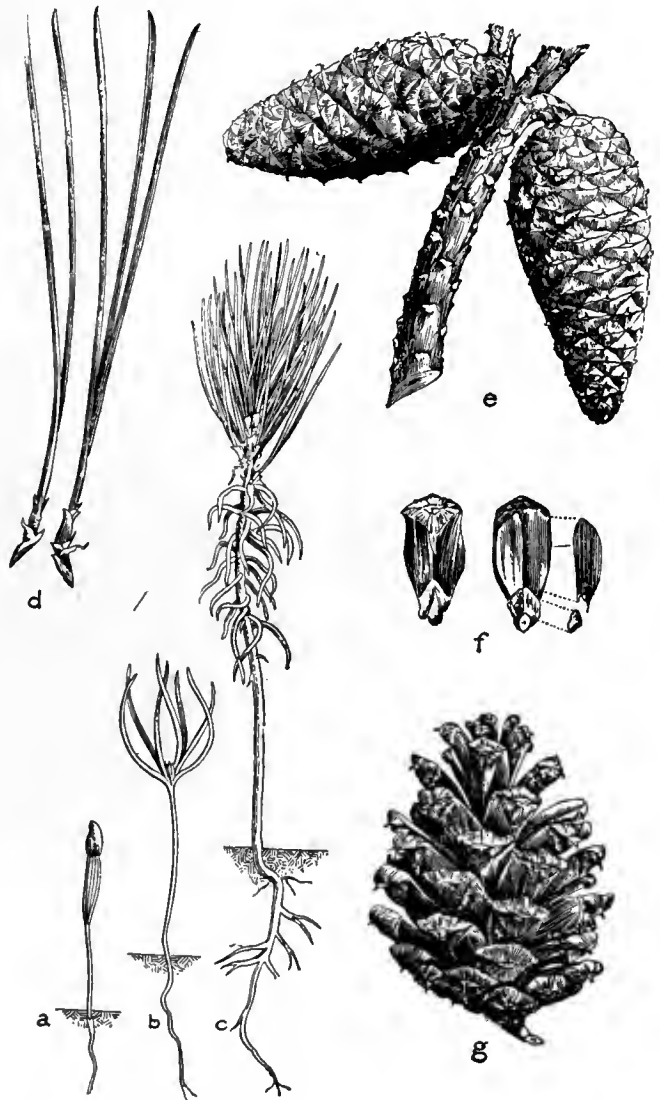
THE RANGE OF THE SHORTLEAF PINE

The heavily shaded portion of the map shows the commercial range of this famous and much-used wood, while the lighter shaded portion indicates its botanical range. It makes its best growth at an elevation of 400 to 1,500 feet.

3,000 feet in the Southern Appalachian Mountains. The Shortleaf Pine has many common names. Some of them are appropriate, while others are misleading and often embarrassing to one attempting to identify it. None of its fifteen common names will ever replace the name "Shortleaf Pine," for its leaves are truly short in comparison with the Longleaf Pine and the other pines with which it is associated. Its distinctive leaves are slender, from 2 to 4 inches long and usually occur in 2's, but

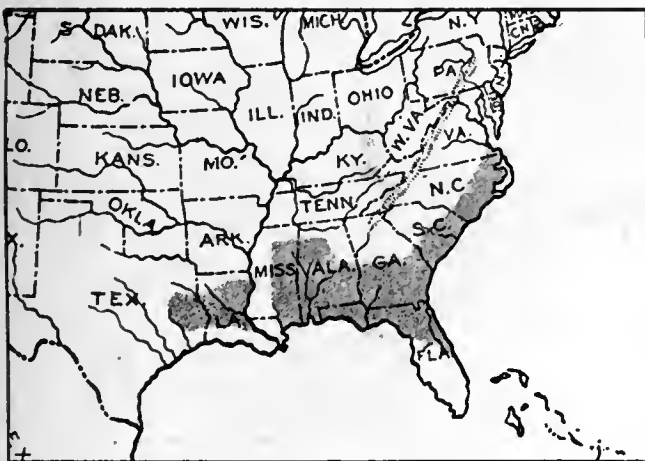
occasionally three appear in a cluster and sometimes four may be together in a cluster.

The cones of the Shortleaf Pine are rather distinctive. They are brown in color, attached to the branches by a very short stalk, from 1½ to 2½ inches long and nearly as wide as long when open. Each cone-scale has an enlarged apex which is armed with a weak prickle. The cones open in early autumn to discharge the small triangular seeds, which are produced in large numbers and scattered widely about the trees. Heavy seed crops are common, which justifies one in being hopeful that nature will propagate this important forest tree and help it gain an important place



SHORTLEAF PINE LEAVES, SEED, CONE AND SEEDLING

- a—Young seedling.
- b—Same seedling after one month's growth.
- c—Same seedling at end of first season showing early bundles of true leaves.
- d—Two-leaf and three-leaf clusters.
- e—Branch with mature closed cones or burrs.
- f—Cone scale and seed with wing detached.
- g—Mature cone opened.



Courtesy Manual Arts Press

MAP SHOWING THE COMMERCIAL RANGE OF LONGLEAF PINE

It occurs from Norfolk, Virginia, to the neighborhood of Tampa, Florida, and west along the coast to the Trinity River in eastern Texas.

in the future forestry of the South. Even as far north as southern Pennsylvania a large number of seedlings are found in openings about mature trees and nearby abandoned fields and waste lands are dotted with young seedlings.

The Shortleaf Pine has a long tap root. This enables the tree to obtain water from a considerable depth below the surface. Even in cases of heavy drought the trees do not suffer very much.

The Shortleaf Pine is a companionable tree. One may find small areas occupied by it exclusively, but in the



AN ARMORED KNIGHT OF THE FOREST

Part of the most northern stand of Shortleaf Pine in America.
Near Mont Alto, Franklin County, Pennsylvania.

major part of its range it is associated either with hardwoods or with other evergreen trees. Pitch Pine and Scrub Pine are common companions, and Loblolly Pine is frequently associated with it upon heavier and rather moist soil. As one approaches the Coastal Plains and other low lying regions of the South the Longleaf Pine is frequently associated with it, and at higher elevations, White Pine and Table Mountain Pine stand by its side. Many kinds of hardwoods such as oak, hickory, sassafras, ash, and cherry are also frequently associated with it.



A YOUNG SHORTLEAF STAND IN ARKANSAS

This is an important timber tree, attaining sufficient size for general forestry purposes, producing excellent wood, a good resin yield and it is markedly adaptable to climatic and soil conditions of the South Atlantic States.



EVEN-AGED MATURE SHORTLEAF PINE IN ARKANSAS

The Shortleaf Pine is a companionable tree and while one may often find small areas occupied by it exclusively, in the major part of its range it is associated with hardwoods or other evergreen trees.

Shortleaf Pine has been an important timber tree for many years and everything points as if it would continue to hold a prominent place in the forest structure of the South. It attains a sufficient size for general forestry purposes, produces excellent wood, yields satisfactory resin and is well adapted to the climatic and soil conditions of the forest regions of the South Atlantic States. It can be regenerated naturally with a satisfactory degree of success, and nursery practice has been so developed that seedlings can be raised satisfactorily and transplanted into the forest. It follows that natural regeneration will take place rapidly wherever favorable conditions are at hand, and if we help nature propagate and perpetuate this tree by planting up such abandoned fields as may



THE GROSS CHARACTER OF THE SHORTLEAF PINE IN CROSS-SECTION

This important commercial wood is medium in hardness and weight, and moderately resinous. It is whitish brown to reddish brown in color. A cross-section of a log shows a broad band of nearly white sapwood surrounding the pale reddish-brown or orange-colored heartwood. The well-defined rings of annual growth are bands of light-colored soft wood surrounded by darker bands of denser, harder and more resinous wood.

develop from time to time, we can be reasonably sure that the future of Shortleaf Pine is promising.

The Loblolly Pine has twenty-two common names. Some of them are quite appropriate, while others are misleading and meaningless. "Old Field Pine" is an appropriate name, for this tree is quite common in old, abandoned fields. Few, if any, trees show such persistency in encroaching upon and occupying abandoned fields and



BARK OF THE SHORTLEAF PINE

The light reddish-brown bark is rather thick and is broken into oblong plates which are covered with thin, cinnamon-red scales that peel off easily.

open places. This tree did an heroic piece of work after the Civil War in restoring a forest growth upon thousands of acres of abandoned farmland in the South.

Commercially it is classed with the other southern pines and sold as Yellow Pine, Southern Pine, North Carolina Pine, or Georgia Pine. Its scientific name is *Pinus taeda*. The second part of its scientific name is inappropriate, for the word *taeda* means "torch," and authentic records tell us that the resinous heartwoods and knots of this tree were not used for torches, as was done with some of the other eastern pines.

The natural range of Loblolly Pine lies in a belt about two hundred miles wide along the Atlantic Coast from Delaware to Florida, and from there along the Gulf of

Mexico to Central Mississippi. It extends over the entire State of Alabama, all of Eastern Mississippi, and a part of Central and Western Tennessee. There are also large areas of it in Texas, Louisiana, Arkansas, and Indian Territory. Over vast areas west of the Mississippi this tree forms extensive pure stands, and there the trees attain a large size and develop a good form. Locally, in the eastern and northern part of its range, pure stands are also found, especially where they have developed in abandoned fields and other vacated places. Under favorable conditions, with plenty of overhead light, the Loblolly Pine develops a long straight trunk, free from branches for 50 to 75 feet from the ground, and reaches a diameter of from 15 to 24 inches, breast-high. Exceptional specimens sometimes reach a height of 120 feet, and a diameter of 3 feet. The Loblolly Pine is not fastidious in its soil requirements, for it will grow on a great variety of sites. In fact, it is adapted to a wider range of soil conditions than any other pine with which it is associated. It grows best on deep, moist, well-drained, porous soil, but



A STAND OF OLD FIELD LOBLOLLY

This has attained merchantable size and it is said that the future of Loblolly is extremely promising, as there is a keen demand for the wood that it produces. Its rapid growth rate and adaptability to soil unsuited for agriculture assure it a place of its own in the development of forestry in the South.



AN UNEVEN-AGED STAND OF LOBLOLLY PINE IN MARYLAND

One of the common names of this species is "old field pine" and it is most appropriate for this tree is quite common in old, abandoned fields. The South owes a debt to the Loblolly Pine for after the Civil War it reforested vast areas of abandoned lands.

also makes a satisfactory growth on dry and rather sterile situations. It is the intermediate soil which it prefers, and for its best development it needs plenty of light. One of the best features of the Loblolly Pine is its thick bark. Trees from 12 to 14 inches in diameter at breast-high may be covered with a bark 1 to 2 inches thick. This unusually thick bark makes it the most fire-resistant of the southern pines, and gives it a place along side of the fire-resistant Pitch Pine of the Northeast. This fire-resistant quality recommends it highly for general forestry purposes. It also possesses other valuable features which make it highly important, wherever possible, to put forth special efforts to perpetuate it as an economic forest tree. The rate of growth of Loblolly Pine varies considerably with the condition and composition of the soil. On the average soil it makes a very satisfactory growth. As a rule, it grows more rapidly than the Longleaf Pine or the Shortleaf Pine. Its wood is coarser and less durable than that of the other pines with which it is commonly associated, yet there are many uses to which it is being put, and present

market conditions indicate that the growing of Loblolly Pine may be more profitable in the future than that of any other southern pine. Its future is bright, indeed, for there is a keen demand for the kind of wood that it produces, and its rapid rate of growth and its adaptability to soil unsuited for agriculture tend to give it a prominent place in the practice of forestry in the South.

The Cuban Pine is the handsomest of all the southern pines. It occurs along the coast from South Carolina to the valley of the Pearl River in Louisiana, and is also found in Cuba, the Bahamas and the highlands of Central America. It is distinctly a coast tree and it is doubtful if the occurrence of this tree can be extended much beyond its natural range, which usually reaches from 30 to 100 miles inland. Where the ground is not too wet it is often associated with Longleaf Pine. The latter tree has longer, more flexible and more drooping needles and larger cones than the Cuban Pine. The wood of Cuban Pine is very hard, heavy, strong, durable, and fully as hard as Longleaf Pine and used for about the same purposes. While it is probable that the range of the Longleaf Pine will be reduced unless special protection is given to it, on the other hand the range of the Cuban Pine may be extended, for it grows rapidly in youth and is an excellent competitor with its associates.

The Pond Pine is a medium-size tree usually 40-50 feet high and rarely exceeding 2 feet in diameter. It occurs in wet flats and peaty swamps along the coast from North Carolina to the banks of the St. John's River in Florida. In the northern part of its range it is associated with the Loblolly Pine and in the southern part it grows with the Cuban Pine. Among its chief distinguishing characteristics are its leaves, which are 6-8 inches long and occur in 3's. Its oval, pointed cones are 2 to 4 inches long and persist for many years. The wood is occasionally sawed into lumber; the low grades are sold as Loblolly Pine and the best grades as Longleaf Pine. Locally, it is tapped for resin which flows rather freely and is fair in quality.

The Spruce Pine is a medium-size tree found on fresh, damp soils and occasionally in swamps from South Carolina to Florida and eastern Louisiana. It usually occurs singly or in small groves, except in northwestern Florida, where it occupies areas of considerable extent. It is easy to distinguish the Spruce Pine from all other southern pines by its short needles, small cones, and reddish-brown and deeply furrowed bark. The needles are in clusters of two and are less than two inches long. Sand Pine is the only other southern pine with needles regularly in clusters of two and usually less than three inches long. The wood resembles that of Loblolly Pine but has little commercial value.

The Sand Pine is a small tree found along the coast of Florida and southern Alabama. It seldom extends inland for more than 30 miles and rarely exceeds 25 feet in height. It reaches its best development in eastern Florida, but rarely is a specimen found which exceeds one foot in diameter. The trunks usually bear lateral

branches down to the ground. Exceptionally good specimens are occasionally cut for small shipmasts. The tree is used chiefly as a soil binder on shifting sand areas so common in the region where it grows.

One of the first steps necessary to the practice of successful forestry in any region is to know the trees which



VETERAN LOBLOLLY PINE TRUNK

One of the best features of Loblolly is its thick bark. Trees from 12 to 14 inches in diameter at breast-height may be covered with bark 1 to 2 inches thick. This gives the tree an unusually high fire-resistant quality.

are to be handled. An attempt has been made in this article to set forth the distinguishing characteristics of the seven southern pines and to point out a few of their most striking features and peculiarities. Each of the southern pines has habits of its own, and by knowing all of them, it will be possible to give a proper place to each separate species in the forests of the future.

The southern pines are known commercially in all parts of the world. Their wood and the naval stores derived from them have been big factors in the indus-

(Continued on page 574)

EDITORIAL

BUSINESS MEN MAY SOLVE FORESTRY PROBLEM

HAVING heard evidence regarding the condition of the forests, the need for measures to perpetuate what forest land is left, and for funds for proper protection from fires, the National Forest Policy Committee of the Chamber of Commerce of the United States is now preparing its conclusions. What this committee recommends will have tremendous weight in determining just what legislation is needed to assure the United States a forest supply for its future needs. Its recommendations will be placed before Chambers of Commerce throughout the country in the form of a referendum, the result of which will be given due consideration by Congress.

The Chamber of Commerce of the United States has done few things of more lasting importance than the investigation of the forestry situation. The outcome will have an effect from which future generations will profit much more than the present, but the citizens of today will have the satisfaction of knowing that they have done for posterity what their forbears by reason of abundant resources and low values could not afford to do for them.

It is safe to say this because there is no doubt now about Congress providing initial forestry legislation which will go far toward meeting forestry needs. The entire country is now aroused to a point where it is demanding reforestation of cutover lands, better protection from forest fires, provisions for growing new forests, and for long time or perpetual production from our existing forests, but it has not found a way to pay for it. Forest products are still a long way from selling at cost of production of new forests.

The Chamber of Commerce Committee has heard the evidence of foresters, timberland owners, lumbermen,

shippers, tax experts and lawyers on every phase of forest growth, protection, taxation, cutting and marketing, and from the mass of information should, and undoubtedly will, be able to be of tremendous service to Congress in indicating the kind of legislation which will best meet all the requirements of the situation.

Citizens have occasion to congratulate themselves because the clear-sighted business men on the committee having heard all sides of the problem will now be in a position to suggest a solution.

There are now two forestry bills before Congress, the Snell-McCormick bill advocated by the United States Forest service, the American Forestry Association, the National Forestry Program Committee, many state foresters, and others, and the Capper bill, backed by former United States Forester Gifford Pinchot and a number of his followers. Each bill will undoubtedly meet with opposition when it is argued before Congressional committees. Each bill will certainly be declared by some to be incomplete, and they will have amendments to suggest; and quite as certainly no one is likely to propose a bill on which all foresters and others best informed on the subject will agree. Thus opportunity for constructive legislation may be lost by lack of harmony in thought and principle.

In this situation then the Chamber of Commerce Committee, having the advice and opinion of the most enlightened minds, has the opportunity to do for the people of the United States a service from which generations will profit—it has the opportunity of pointing out to Congress the legislation required to protect our remaining forests, to create new forests and solve the whole vitally important forest problem.

INTELLIGENT MANAGEMENT OF CITY PARKS

WITH the return this summer of the open season in our city parks came a marked renewal of public interest in these invaluable recreation centers. And the outstanding result of this renewed interest it seems is the fact that the public is now awakening to the present unsightly and unkept condition of the parks.

While there are no doubt competent and sincere officials in charge of our parks, it is also true that the greater number are selected for political reasons only, without a thought as to their competency or knowledge of the work they are expected to properly direct or to do. And as a sequence, the already large appropriations are squandered with very little that is concrete to show for the year's work and expenditure.

The fact that there are fine specimen trees and shrubs in our parks, many of which have required many years to develop, does not indicate that such trees need no further attention. On the contrary, a tree which has taken years to develop may be by neglect wholly lost

or seriously injured in a single season for want of proper attention, in not removing the dead wood, or from insect pests, lack of good soil and other causes. Unfilled cavities and dead wood not only aid in the destruction of trees and shrubs, but surely mar the beauty and destroy the landscape effect, as do also dead trees and shrubs not removed.

In a word then, cannot this awakening interest and efforts of the public spirited be made to bring about a new order which will put competency and knowledge before party favor and political motives in the selection of park officials and thus assure the people and the taxpayers of conscientious and efficient management of the parks, thus paving the way for better things to follow.

In a recent address Hon. E. T. Meredith, former Secretary of Agriculture, remarked "that politics has no place in matters of this kind," which sentiment rings true as especially applied to the care and management of our city parks.

A PERMANENT FOREST COMMUNITY

WOOD TURNING contains an interesting account of a permanent forest community which affords a pleasant contrast to the deserted villages that in so many regions have followed in the wake of the lumber industry. Already for three-quarters of a century the factory which supports the little settlement at Forestdale, Vermont, has been producing small handles, toys, and other wood turnings. Moreover, there is every prospect that it will continue to do so indefinitely, since its owners have taken the very wise precaution of safeguarding its supply of raw material. Some 8,000 acres of forest land have been acquired and are being so handled as to insure a perpetual supply of timber from them. Considerable forest planting has been done and improvement cuttings are being made. Net profits of about \$128 from two thinnings of a five-acre lot of white pine show that the benefits from such work are not necessarily confined to the future.

From a social and economic standpoint Forestdale bears striking witness to the value of permanence in our forest and wood-using industries. Not only does the wood-turning plant continue to add year after year to the world's wealth, but its employes are able to establish themselves in permanent homes, most of which they own, and to bring up their families in the midst of a comfortable and wholesome community life. Many of those now at the plant are the children and grandchildren of older employes, and there is a general friendliness and recognition of mutual interest between the workers and the management which is impossible in the unwholesome atmosphere and surroundings characteristic of so many purely temporary enterprises. From every point of view there is a decided advantage in the permanence which only the practice of forestry can impart to industries dependent on forest products for their supply of raw material.

WOMEN WORKING FOR FORESTRY

THAT women can work for forestry and can aid materially in getting trees planted and in securing forestry legislation is the fact which Julia Lester Dillon, chairman of forestry for the Georgia Federation of Women's Clubs, states in a letter she has sent to the members of the clubs. Mrs. Dillon says, and what she says applies to women in every state: "The day is past when the women of Georgia can be content with the planting of a few trees, the location of a few others and the conservation of all, and call it forestry work. The day of greater effort has come. The day of great opportunities for service is with us. Hear the clarion call. Education is the first step in any forward campaign. Therefore, the first item for the development of the forestry department is information. To secure this it is necessary for the clubs and club members individually to identify themselves with the work of the American Forestry Association by becoming members, which insures to them the AMERICAN FORESTRY magazine, which is one of the most interesting and beautiful magazines published. Other states are calling upon their Boy Scouts to replant deforested areas. Twenty-five boys of New York planted 14,000 trees in the John Burroughs Memorial Forest this spring. In another state the Boys' Farm Clubs are being interested by the farm demonstration agents in the work of the forestry department. Each club is studying timber resources, locating denuded tracts, planning to replant waste areas, learning how to cut out the timber that is ready, learning what not to cut, planning to reclaim washed-out lands by planting trees with wide-spreading net-like roots to fill up the gulleys and hold up

the washed banks. Can you think of anything that will mean more to the agricultural future of the state? Why not Georgia? If the women's clubs can secure the cooperation and interest of these agents and through them of the boys themselves and next winter when farm work is light set about having reforestation done, the greatest factor for present usefulness and future welfare is secured. If the boys of today plant over the denuded tracts, help to reforest the watersheds, the men of tomorrow will not need to be urged to pass laws for forest protection. Our legislatures and Congress will perforce listen to the demands of these citizens who ask because they know. Our forestry department stands for the protection of all wooded areas in the State of Georgia. It calls to the women voters to get in line and demand of our legislators, state and federal, protection of our forests. The most crying need right now is the passage of the national forestry bill. A map recently published by the Southern Forestry Congress and sent out by the secretary, J. S. Holmes, Chapel Hill, N. C., shows the whole of our sovereign state of Georgia in the blackened area exposed to fire menace and without forest protection. Is there a citizen who has not seen fire-blackened wastes in our pine forests caused by a carelessly thrown match or cigarette stub or marking a deserted camp site or any one of a hundred causes? Why wait until further damage is done? Can we afford to have our remaining wooded resources burned up, cut over, wasted, in the present as they have been in the past? In the end, as in the beginning, study is needed. We must learn about the forest resources if we would preserve them.

ENVOIOUS OF PENNSYLVANIA

THE need for senators and congressmen with a proper appreciation of the forestry requirements of their state is aptly illustrated in a forceful editorial in the *Chicago Tribune*, which says: "AMERICAN FORESTRY, the magazine of the American Forestry Association, prints a map in the July number showing an area of 1,000,000 acres, covering more than half of four counties of northeastern Pennsylvania, which is to be purchased by the government to protect the head waters of the Allegheny River and to develop a renewal forest. Is it any wonder that United States senators and representatives from Pennsylvania are returned to Congress by their constituencies term after term? They get practical results for their districts and their state. They are less concerned with panaceas or patent nostrums for the correction of national or international ills than with doing something which will improve the welfare of their constituents and provide for the future of their state. Reforestation is a commendable enterprise. It not only conserves the water supply of a large section of Pennsylvania, but promises to provide

much needed lumber at reasonable prices in the future. Pennsylvania makes it a practical reality through federal aid. The interest of its congressmen in the patent nostrums of legislation is merely in their value for trading purposes. What wise man would not trade a vote for the Norris bill for one favoring purchase of 1,000,000 acres of land for reforestation in his home district? Why cannot the agrarian bloc in Congress do as much for the Middle West? Wisconsin has large tracts of land in crying need of similar reforestation, and worthless for any other purpose. Illinois and the entire Mississippi Valley is in need of improved waterways. At least sixteen states of the Middle West are asking for congressional approval of the St. Lawrence seaway. Many states and thousands of manufacturers want the elimination of the "Pittsburgh plus" system for fixing prices on steel products. There is plenty of practical work for the agrarians in Congress. If the Pennsylvanians can get practical results in Congress why cannot the Middle Westerners?"

THE SAD STATE OF MICHIGAN

HOW Michigan neglects its forest land, how it allows forest fires to annually add to the destruction already caused by reckless lumbering, and how it might regain some of its lost forest wealth is the subject of a forceful interview with James Oliver Curwood, nationally known as a writer of wild life in the woods.

That Mr. Curwood is indignant when he views the condition of his own state is natural. There is plenty of cause for indignation, and he voices it by saying:

"I have seen scores of forest fires in northern Michigan in the last three weeks and hundreds of thousands of acres burned simply through the lack of proper preventative measures instituted by the state. With proper fire protection service, it would not be difficult to eliminate at least 75 per cent of the burned area we have in Michigan each year.

"In many eastern states, it creates a sensation when a single township burns over. Michigan is at present the worst burned state in the country and this in face of the fact that Michigan is absolutely the best equipped state, naturally, for the propagation of forest and wild life.

"Here we have vast areas of ideal pine land that could be replanted. Instead of replanting, we allow thousands of acres of young trees to burn each year and never make an effort to replant them.

"Michigan could be one of the greatest pulpwood states in the Union and at a time when paper is almost invaluable it would seem that those directing the state's governmental affairs would realize this.

"I believe that I am stating a very fair estimate when I say that the people of Michigan are losing \$50,000,000 a year because of the lack of conservation and propagation, which has been so utterly forgotten by those political helmsmen of the state's affairs.

"There should be organized in Michigan a forest protection system so complete that within a very few years this state would again be the leading lumber and pulpwood state of the Union.

"Not only should forest fires be eliminated, but we should have great state nurseries from which we could plant hundreds of thousands of young forest trees each year. The men who would protect our forests from fire could also be our planters of trees. An expenditure of \$1,500,000 a year would repay the state and its people fifty fold in dollars alone."

Mr. Curwood has the right idea of what should be done. Now, as one of the leading citizens of Michigan and a man of action, let him write and write and write until he has the people of the state aroused as he is aroused. Then Michigan will have forests again.

GEORGIA AWAKENS

GEORGIA has at last awakened. The state legislature has passed a forestry bill by an almost unanimous vote. The bill provides for the creation of a state board of forestry to consist of the Governor, the Secretary of State and three citizens to be named by the Governor. The progress of forestry in the state largely depends upon the powers of this board and the appropriation given it for its work. It is to be hoped that the board

will be non-political. That is up to the Governor. Experience in other states has shown that non-political boards usually are able to do much more for forestry than those which consider politics first and forestry second. Let us hope that the Governor will consider forestry much more important than politics. He has a great opportunity to do a great work for his state.

THE BANDELIER NATIONAL MONUMENT

BY WILL C. BARNES

HERE'S a story in the paper about a New National Park, let's go and see it."

The lady across the dinner table pushed the evening paper under my eyes. I glanced at the headlines to which she pointed. "The Bandelier National

Her womanly curiosity was fully aroused. "Ruins in America; real ruins and in the west at that. I thought the west was new?"

"New nothing," sarcastically, for here I felt on fairly safe footing, "why, the descendants of the ruin builders

were found living among the ancient habitations of their ancestors half a century before the English set foot at Jamestown. Perhaps they were even planting their corn fields and performing their strange ceremonial rites when the Norsemen were building the old mill at Newport.(?)"

I could have overwhelmed her with other information but she cut me short. "Let's go and investigate the Bandelier National Monument this summer."

So we went, and this shall be a record of where we found it and what we saw there.

As all stories must have a beginning somewhere, this may well begin at lovely, incomparable Santa Fe, than which there is no more interesting spot in the United States. About her

Monument," it said. "Pish-tush," I remarked, using the most up-to-date explosive known to the literary fraternity, "that's not a National Park, that's a National Monument." The ignorance of some people is astonishing.

"And what's a national monument?" she blandly inquired.

"A national monument," rather hesitatingly, I'll admit, "a national monument is—is—well it's a—"

"I'm listening," was the only comment.

"Well, a national monument," I began more slowly, "is a cross between a national forest and a national park. It has all the attributes of both; it may be a national curiosity like the Arizona petrified forest, a huge playground like the Muir Woods at San Francisco or a group of these old pre-historic ruins that abound through the southwest." I stopped, fearing to tread further on dangerous ground.

little "plaza" there clusters more of historic interest than about any other acre of ground in the Western Hemisphere. Over the three-centuries-old Governors "Palace" that faces it, the flags of four different nations have at various times been flung to the breeze. Viceroys of



THE OLD "PALACE" AT SANTA FE, NEW MEXICO, RECONSTRUCTED ACCORDING TO THE LINES OF A VERY OLD SKETCH RECENTLY DISCOVERED

From the more than three centuries old Governors Palace at Santa Fe, the flags of four different nations have at different times been flown.



VIEW OF TUSA CLIFFS AT FRIJOLES

A side canon of the Frijoles region. Note the countless holes in the rock, some natural, many artificial.

Spain; Generals and Governors of Mexico; and even bold Indian chieftains have held their official abode within its walls four feet thick. From it in August, 1864, General Armijo, representing the Mexican government, set forth with bombastic proclamations to drive the despised "Gringo" from New Mexico, then part of Old Mexico, but six days later bluff old General Stephen Kearney stood in the self same place and took possession of the country in the name of the United States.

In 1862 the flag of the Confederacy flew from its staff for a few days but its stay was brief and the stars and stripes soon displaced it. Had we seen no more than

and drops—no, almost falls to the river over a steep grade. The stream is bridged with a ramshackle affair of logs that impresses one with the idea that it is likely at almost any moment to drop the passerby into the emerald green waters dancing beneath it.

Here at an old sawmill town we leave the motor, although it is a good auto road clear to the Canyon of the Frijoles, and with our camp outfit packed on two mules and ourselves on saddle horses climb the breast of the mountain over a grade that winds and twists its way upward like some great tawny snake, for the soil here is as yellow as gold. Its a good three thousand feet from



LOOKING DOWN ON THE REMARKABLE AMPHITHEATRE

Almost directly beneath us is a large crescent-shaped object—looking like a huge piece of honey comb and positioned like a great amphitheater. Once a huge pile of rubbish, it has been excavated and exposed to view by the Santa Fe Archaeological Society.

Santa Fe the trip would have been well worth while.

A paper ribbon flung into the air at carnival time could not drop to the ground and form more fantastic curls and loops than does the road that leads out from Santa Fe towards the "Bandelier National Monument." It rises and falls with the contour of the landscape, winding and twisting across the semi-desert region as if uncertain at which point it will break its way through the grim ramparts of the Jemez mountains that loom against the sky line, miles to the northwest. Occasionally to the left and far down below one catches sight of a streak of green water flecked with white; the historic Rio Grande, and finally the road turns abruptly towards it

the river to the top of the mountain and soon we meet the first yellow pines, harbingers of the great unbroken forest above. At the top we plunge into its very deeps through which we ride for twelve miles, the air heavy with its lige-giving odor, across lovely forest parks, their grassy vales dotted with wild flowers of every hue, blue bells, pestamon, Indian pinks, petunias, phlox and a dozen more garden favorites, splashing through happy little rivulets rushing madly towards the river far below, the road ever climbing higher and higher. We turn corners of the mountain where the country falls away steeply and as far as the eye can reach is one great sea of hills and valleys, distant peaks, flat topped mesa

buttes; a glorious panorama radiant with the wonderful coloring of the region.

Clear in the horizon a thin wisp of smoke floats skyward from a train on the main Santa Fe road forty or more miles in an air line from where we sit.

A plunge into a dense thicket of cedar and pinon through which we can scarcely see ten feet ahead, and

woods, alders and pines a rollicky little brooklet, an ideal trout stream but for the fact that a few miles below, it drops over a sheer precipice of almost a hundred feet up which no fish have ever found their way. Half hidden in a grove of trees just under us we catch glimpses of white tents, and the roof of a large stone house from the chimney of which the rising smoke speaks of the good cheer to be found in the home of the representative of the Forest Service who keeps watch and ward over this Pompeii of the New World.

The dirty grey walls of the canyon are pitted with thousands of openings large and small, many of them natural cavities worn by the elements into the friable volcanic rock, but many more are doors, windows and smoke holes drilled into the sides of the canyon by the strange people who once lived here.



THE STRANGEST HOMES IN THE WORLD

Thousands of rooms have been bored into the rocky walls. A line of small holes above many of these rooms is presumed to have been used to support the roof of a veranda or porch.

suddenly the road ends almost on the brink of a mighty chasm, a gash in nature's face, mute evidence of her warfare with the elements.

Nobody tells us to stop our horses. The action is absolutely automatic. We even pull the animals back a step or two lest they stub their toes and drop themselves and us—especially us—over the edge along which they make strong attempts to nibble at a vagrant spear of grass that hangs over the cliff. Whoever has ridden one of the mules down the Grand Canyon trail to the Colorado River in Arizona knows the feeling inspired by this act. It is essentially one of the best methods of developing goose pimples and ragged nerves known to civilized man.

We dismount and step gingerly to the edge of the cliff and stand there entranced, for we are looking down into a gorge cut hundreds of feet deep into the solid rock, the far side nearly a mile distant. The wall beneath us is almost perpendicular while the opposite side slopes back at an angle of perhaps forty degrees. At the bottom the "Rito de los Frijoles," a Spanish phrase, which anglicized means just plain "Bean Creek," known to the ancients of the region as "Tyu-on-yi"—the treaty, the compact—threads its course through groves of cotton-

woods, alders and pines a rollicky little brooklet, an ideal trout stream but for the fact that a few miles below, it drops over a sheer precipice of almost a hundred feet up which no fish have ever found their way. Half hidden in a grove of trees just under us we catch glimpses of white tents, and the roof of a large stone house from the chimney of which the rising smoke speaks of the good cheer to be found in the home of the representative of the Forest Service who keeps watch and ward over this Pompeii of the New World.

Below us on the floor of the valley is a large crescent-shaped object, for all the world like a huge piece of honey comb or a number of small pens built of rock. It rests like a great amphitheatre, the two ends of the crescent coming close together leaving a comparatively narrow opening or passage way into the enclosure or plaza formed by the crescent, which for defensive purposes, might have been closed with a gate. This the Forest Ranger tells us is



A PRESENT DAY CEREMONIAL DANCE

The long lines of dancers swaying back and forth in their rhythmic posings.

one of the communal houses or buildings of which so many are found hereabouts and which, until it was excavated and cleared of the rubbish of centuries by the Santa Fe branch of the American Archaeological Society, was merely a huge shapeless mound.

A little to our right as we stand at the edge of the cliff the ranger points to what he calls the "jumping off

place." Here in a break of the canyon wall the Forest Service has built a safe and satisfactory trail down to the creek below. The men of the Forest Service dare to dream that some day an appreciative Congress will give them the money with which to construct a wide wagon road here down which teams and autos may pass with safety and ease.

Half a mile up the canyon from the bottom of the trail we find, under a group of pines, a delightful camping place with plenty of grass for the animals, wood for fires and ice cold water in the creek that babbles not ten feet from us. What more could one ask for in a camp?

That night the full moon crept quietly over the rim of the canyon lighting up inch by inch the wonderful wails where, hundreds of years ago, these dead and gone peoples dwelt in peace and contentment. As we sat about the campfire we tried to visualize the scenes in the long gone days when each of these rocky rooms had its tenant. The children played in the same moonlight that was now bathing every nook and corner of the canyon, dogs barked, the coyotes howled back their shrill defiance, and the fires glowed cheerfully as the women baked their thin sheets of corn bread or boiled the corn meal mush for the morrow's festivities just as the women of the pueblos in this region do today.

The campfire dies down, our white tent looks ghostly and uncanny in the deep shadows of the trees, half a dozen coyotes split the cool evening air with their "yap, yap, yap," and from down the canyon some lone wolf makes the night vocal with his long mournful howl, while the dogs at the camp below us bark their loudest at these skulkers of the forest.

How good the camp bed feels as we turn in, weary with the day's ride; we plan the morrow's trips of investigation—yawn—now who's that chopping wood at such an unearthly hour? Why can't these forest rangers wait till its morning to do such things? What; morn-

ing? Nonsense, surely not? But there's the sun peeping over the mountain above to prove the night has passed all too quickly. An hour later we are ready for the day's explorations.

One scarcely knows where to begin there are so many points of interest to see. Here is a scattered ruin that, by its debris, must have been five or six stories high in places, the building of which must have been a labor of no mean proportions. There thousands of rooms have

been bored into the rocky walls, some of them ten or twelve feet square, and, if the theories of those who have studied it are correct—and everything indicates they are—some of the rooms must have been used in a series of stories one above the other and reached by log ladders. A line of small holes, each about six inches in diameter, and bored into the rock perhaps a foot which runs above many of these rooms is presumed to have been used by placing in each hole a long cedar or pine post which at its further end rested upon a cross pole supported at each end by a forked post set into the ground. This was then covered with grass and other materials on top of which earth was placed, thus forming a roof for one story and a floor for the other.

Most of the openings into these rooms are from three to four feet high by two and a half wide and often are carried back several feet before the room itself opens up. Sometimes there is a small room, a sort of alcove affair in the rear of the front or main room.

The floors are smooth and often leveled up with a mud plaster almost like cement in its hardness, and some of the walls are plastered with the same material. In many there are small holes or openings leading to the outside, undoubtedly smoke holes and for ventilatoin. Some of the rooms are badly smoked while others show no signs of fires ever having been built inside them. On the sides of many, small holes have been bored into which no doubt poles were placed upon which their clothing and other household furnishings were hung as one sees them today in every pueblo



SOME OF THE ROOMS WERE WALLED IN FRONT AS THIS ONE HAS BEEN RESTORED

Within this room a well-known American authoress wrote one of her most interesting books.

dwelling room. Just how the poles were placed in the holes is not clear unless they were sprung in while green and flexible. In several we found holes placed at such points as to make quite certain they were used to hold the poles that supported the rude looms or weaving frames of the blanket weavers as the Navajo squaws now suspend the upper pole of their looms between two forked posts set in the ground. On the walls of many were small niches perhaps a foot high and six or eight inches deep into the rock used doubtless for holding the ceremonial prayer meal, or some of the many household deities, "Kacinas" the present day pueblos hold so dear.

Possibly some of these rooms were used for store rooms while the family lived in the masonry built houses in the canyon below. Often these were built right against the wall of the canyon in front of the room so the family stepped direct from the excavated rooms into the masonry ones outside.

Some of the cave rooms are decorated with rude colored drawings of animals, men, birds and odd geometrical designs. Some thus decorated may have been and doubtless were used for ceremonial purposes. One large room is decorated with a huge serpent, the "plumed serpent" of the Pueblo Indians many of whom, especially the Hopi, believe the people of this earth sprang from the union of the "Snake woman" of their mythical life and a pueblo youth.

Toward the head of the valley there is a wonderful ceremonial cave located in a large natural amphitheatre in the solid rock perhaps two hundred feet above the floor of the valley. For years it lay undiscovered, being finally located by some one from the opposite side of the canyon.

The cave itself is very large, being more than a hundred feet long and sixty or more high in front, sloping back to about eight or ten feet at the rear.

In the center of the cave or amphitheatre is a "Kiva" (Kee-vah) or ceremonial chamber which has been cleared

of the debris of ages and carefully restored to its original condition. The restoration consisted more of clearing out the rubbish than of rebuilding, for excepting the new roof of heavy cedar logs, the room now is practically the same as it was the day these dead and gone people used it for the last time. The walls were originally plastered with mud smoothed down by the hands of its builders, and you can see the very fingerprints and almost the "life lines" of their palms in the plaster,

so fresh and clear it is difficult to believe it was not done yesterday.

There is more or less ornamentation on the walls the colors of which are bright and unfaded after the ages they have been there. On the sides are the usual niches found in kivas of today at Taos, Cochiti, Zuni and other modern pueblos. In the center of the roof a small hatchway about two and one-half feet square gives entrance to the room below. The long slim ladder poles rise above the roof just as they once did and one can easily picture the scene in the olden times when the mystical ceremonies took place and the totem of the clan occupying it swung from the end of the ladder poles warning all outsiders to keep their distance.

You see the long lines of dancers swaying back and forth in their rhythmic posing, the cave lit by the great fires that flung their ruddy glow far out into the dark of the canyon below while the sacred drum, formed of a huge pottery olla, its mouth covered with a deer skin, sent its boomings reverberating back and forth between the enclosing walls of the canyon. Thanks to the labors of the Anthropological Society of Santa Fe these restorations have been done by those who loved their work, and done well. Here each year come members and their friends to camp for days amid such interesting surroundings. Lectures are given, papers read, other ruins of which there are an unending number, opened up and explored and every one has the time of their life.

Again the full moon moves majestically out from the



A REST AFTER A STEEP CLIMB

Just outside of one of the thousands of rooms in the rocky walls. The small hole above the door was evidently a smoke hole or for ventilation.

cliffs above and lights up the canyon. A coyote sends his long shrill cry from above to be answered by its mate in the canyon below. The camp fire burns low, the river gossips and gurgles over its stony bed and snuggled down in our blankets we dream the valley is once again teeming with those people of the long ago, the women pass back and forth from the stream carrying on their heads the ollas full of water, climbing the long ladders without touching their hands to them or spilling a drop of their contents. The men tend the corn fields or gather fire wood from the mesa above, while everywhere the children romp and play as only the pueblo children can, for of all children those of the pueblos in this region are the happiest.

In our dreams we hear the voice of the village crier calling the people to their daily tasks exactly as he does each morning at Taos, Walpi and other inhabited pueblos and wake to find the first grey signs of approaching day tinging the tips of the canyon walls. The crier we heard was the camp cook.

By ten o'clock we are packed up and climbing out on the far side of the canyon up a more reasonable trail than that we used coming down on the other side, bound for the place where rest the sacred "Lions of Cochiti," two remarkable carved figures of whose origin or the true

purpose for which they were carved no one really knows beyond the mere assumption that they were used in some of the olden time ceremonies by the forefathers of the present inhabitants of the nearby pueblo of Cochiti (Co-che-tee). Through a wonderfully beautiful stretch of yellow pine timber open and clear of underbrush as

some city park, we ride for several miles then drop into a deep canyon only to climb out again and into another still deeper.

More climbing and we are at the place where rest the stone lions. Here amid cedar, pinon and scattered pines through which are dozens of ruins both large and small, these remarkable objects rest in the center of a circle of huge stones set up on end as if for a fence, a narrow lane leading out from it also fenced with stones. This lane or entrance is about fifteen feet long and three wide and faces towards the south. Unfortunately some vandal hands have destroyed parts of the lions, but there



TOWARD THE HEAD OF THE VALLEY IS A WONDERFUL CEREMONIAL CAVE LOCATED IN A LARGE NATURAL AMPHITHEATER

For years this cave lay undiscovered until located from across the canon. In its center is the "Kiva." Note the ladders placed for reaching the cave.

is still enough of them left to show their general form and shape. They lie side by side carved from huge boulders lying deep in the ground, two great mountain lions, their heads upon their fore legs spread before them, their long tails lying straight out behind, as if posed for a spring at some enemy. From all that can be learned from the Cochiti Indians, whose village lies



A HIGH AND STEEP CLIMB

One of the ladders by means of which the Ceremonial Cave is reached.

about fifteen miles below in the valley, these lions were carved by their people and represented a shrine to which they came year after year to hold some of their peculiar and interesting ceremonies. Among all the pueblos the mountain lion is the symbol of one of their secret cults or clans and doubtless these carved lions were peculiarly sacred to the ancients.

For some unknown reason these ceremonies are not now celebrated at the Lions' shrine and the place is seldom visited by the Cochitis unless as guides to people desiring to see them.

Ten miles further down the canyon is the well known "painted cave," "El Cuervi pintada" of the Spanish, a huge natural amphitheatre high up on the walls of the canyon. On the rear wall of the cave are many odd designs in colors, some red, some blue and others black. Most of them are very old and were there when the cave was first visited by early explorers centuries ago. Others are frankly modern, the work of thoughtless tourists and some done no doubt by the Indians them-

selves within the last decade. Here as elsewhere the vandal has done his work and one finds emblems of secret societies, initials of visitors, and such wretched evidences of man's thoughtlessness and lack of decency all over the walls of the cave. Since the forest rangers have been in charge of the region, however, such work has been stopped and they tell with great joy of one visitor who cut his name and address deep into the stone wall only to be overhauled and brought back by the ranger and forced to erase the whole matter by rubbing it with a hard stone until not a single trace of his self advertising scheme was visible. The cliff being almost perpendicular you must be almost a lizard to reach the shelf above, shallow "toe holds" cut into the rock offering a very precarious footing. One of the more adventurous of the party however climbed up taking with him a long rope which when looped over a handy projecting point of rock enabled the rest to scramble up in comparative safety.

The ladies, however, declared they could see all that was worth seeing from the ground and while we were examining the cave they went searching for arrow heads,



THE RESTORED "KIVA" IN THE CEREMONIAL CAVE

The heart of the Ceremonial Chamber cleared of the debris of ages and carefully restored to its original condition.

quantities of which are found all over the region. Shrieks of terror from them brought us to the edge to see both perched upon the very highest boulder around, skirts gathered about them and squalling "snakes, snakes," at the top of their voices. Incidentally the rock they climbed had neither "toe holds" nor rope, but they reached the tip top with little delay, just how, they were unable to say. We descended from the cave in much less time than it took to get up, finding a rather large sized diamond backed rattler comfortably coiled a few feet from the rock, rattling his caudal appendage just often and loud enough to make certain the women would stay there to the end of time rather than try to escape. A piece of cord formed into a lasso soon caught the noisy gentleman and we went back to camp that night with several of his pictures in our camera and his rattles ornamenting the hatband of one of the ladies.

Lest this be considered a sign that such incidents are of frequent occurrence let me hasten to say that this snake was the only one we saw in this region during a fifteen days' trip.

Naturally the first question that comes to one's lips is: Who were the builders of these ancient dwelling places, where did they come from, where did they go, and of equal importance, how old are they?

As to the first question, ethnologists and students of the subject agree that they were the forefathers of the present pueblo Indians such as the Hopi, the Acomas,

Zuni and other native peoples now living in the region occupied by the ruins which is roughly all of northern Arizona and New Mexico and southwestern Colorado. All the legends and folk lore of the present day pueblos tell of the ancients who formerly lived here and peopled these deserted homes. Further than this the excavating that has been done all through this region clear down into southern Arizona, near Phoenix, has discovered plenty

of evidence to substantiate this claim in the shape of totems, symbols, pottery and other "relics" that connect the present with the past in such a convincing manner as to fully justify the statement that the present pueblo Indians are of practically the same stock as the people who built these wonderful ruined dwelling places, although through infusion of other blood there have been characteristic changes in type.

Where did they come from? Doubtless from the northwest. Many attempts have been made to connect them with the Aztecs and Taltecs of Central

and South America but there is little upon which to base such belief. Most difficult of all is to reach some conclusion as to where they went when they left; and why. Was it war, pestilence or some wholesale migration that caused them to leave these homes built with so much labor? Pestilence it could not have been, else there would have been more evidences of their burial places. So dense a population as existed must have had many



THE APPROACH

This shows the roughly walled entrance lane to the circle in which lie the "Stone Lions."



THE STONE "LIONS OF COCHITI"

They lie side by side, carved from a huge boulder lying deep in the ground. Vandal hands have destroyed parts of them.

deaths from natural causes, yet but comparatively few bodies have been discovered in the neighborhood of the largest ruins. Some of the bodies found have been rudely embalmed or at least an attempt seems to have been made to preserve them from decay, and burial within the rooms seems to have been practiced to a limited extent. As for cremation, there is little or no evidence



BEAUTIFUL, BUT HORRIBLE TO BEHOLD

A piece of cord caught the noisy gentleman, but not until he had given the feminine members of our party a good scare.

that this was practiced. That they were the prey of other and more warlike tribes is quite certain, but there seems to be no positive proof that they migrated to any distance. The most satisfactory theory on this subject is that these ruins were not all occupied at one time but were built and used for a period of years, then deserted for some peculiar reason, either by whole villages or separate families who moved out from the old homes and built others perhaps immediately adjoining them or at some distance. This is more or less substantiated by the actions of the pueblos of today for at Hopi, Zuni, Taos and other inhabited villages one can see similar changes and moves taking place each year.

Near the Hopi villages in northern Arizona Doctor Fewkes, of the National Museum, unearthed from a huge mountain of drifting sand a complete village, obtaining the hint as to its presence from the old men at Walpi, one of the Hopi towns, who told him their legends mentioned the covered city as having been occupied at the time the Spanish visited the region between 1542 and 1543. They even had a name for this lost city although it must have been completely buried for at least two centuries. This is true also of hundreds of other

buried towns all over the region, the legends of the pueblos furnishing names for almost all of them.

Thus it comes that while the numbers of persons living in some of these towns must have been large, it does not follow that all the rooms in each ruin were occupied at the same time or that the total population can be estimated on the basis of the number of rooms or dwellings. Following this theory to its logical conclusion we may believe that after a certain group of buildings had been used for many years, the inhabitants for some unknown reason migrated to another site and there started a new city which eventually went through the same process of building and ultimate abandonment. Perhaps some scourge carried off numbers of the people and they



THE STEEP ASCENT TO THE PAINTED CAVE

One had almost to be a lizard to negotiate the steep face of the rough, rocky cliff and reach the cave.

vacated the town just as the Navajos who have always divided this country with the Pueblos, do at the present time, for they at once desert the family "Hogan" no matter how well built and comfortable, when any member of the family dies in it, and, moving off to some distance, erect a new one. Let lightning strike a tree under which a Navajo hogan stands and it is at once vacated and

thereafter shunned as a "bechindy hogan" (haunted house). Nowhere in the west is lightning more common and destructive than in this region, and doubtless the ancients had the same fears of it the Navajos now have.

As for their age, who shall say how old they really are. Here for instance is a group of houses the walls of which are six or eight feet high, the debris about them indicating at least three stories. In the center of the mass of rubbish that has engulfed the whole village stands a yellow pine tree not less than three hundred years old. When Coronado and his army of "Conquistadores" marched through this region in the years between 1542 and 45 many of these ruins were noted looking just as old, mysterious and "ruiny" as today. Thus far back we have historic evidence of their age.

It is easy to imagine their builders were living in them when Columbus set sail for the unknown west. Perhaps the women, who are the home builders of the pueblos, were carrying the stones and mortar with which to build these houses, up the long ladders or steep trails at the very time when Alfred the

Bible that it is—may we not in reason believe that the people who built some of the abandoned cities and dwelling places were living in them the very night the Shepherds saw the star in the east? Maphap from some



A GROUP OF CO-CHI-TI BOYS AT THE GREEN CORN DANCE

The boys are taken into the several "clans" very early in life and take part in the ceremonies with as deep reverence and dressed exactly as their elders. Of all children, those of the Pueblos are the happiest.

of the watch towers which are located on almost every prominent point along the deep canyons, and on top of the highest buttes with which the whole country abounds, the "lookouts" of these lost peoples also saw the star of Bethlehem and wondered at its beauty.

From all the information so far developed by a study of these ruins and the material unearthed in them, their builders were a peaceful, agricultural folk, depending for their sustenance upon their fields of corn, beans, melons and such products as they knew in those days, while for meat they had the game animals such as deer, antelope, turkeys and rabbits which abounded in the region.

From all the signs they probably lived at first along the streams and in the large valleys where today their irrigation ditches can be traced for miles as they worked their devious ways from the watercourses to the often distant fields. These ditches were laid out with such

excellent engineering ability that after centuries of disuse the American settlers have, in many instances, utilized them for their own irrigation purposes. After living in the lower country for perhaps centuries they may have been forced back by some aggressive and war-



THE WEIRD LOOKING "PAINTED CAVE"

Ten miles down the canon is the "Cueros Pintada"—the Painted Cave. A huge natural amphitheater, high up on the canon's wall.

Great was harrying the Danes in the North seas.

The Mormon people believe the ten lost tribes of Israel were the progenitors of the western Indians. Accepting this belief of the Mormons as plausible—and any Mormon missionary will soon convince you by the

like race, to the higher and more inaccessible regions where they built those huge communal dwellings some of them with hundreds of rooms, built in solid squares often running up several stories with few or no entrances on the ground but entered mostly by ladders through roof openings like ship hatchways.

Probably in time these failed to give them the needed security and they migrated once more into the deep almost inaccessible canyons where they built those wonderful aerial cities tied to the precipitous sides of the cliffs more like swallows' nests than human habitations, hundreds of feet above the floor of the canyons. There is a possibility they used all these several places of residence more than once returning to the open areas when the pressure from their enemies was lessened or ceased.

A very old Apache Indian once told how his people lived for several years in a series of large and apparently very old cliff dwellings on the lower Tonto Creek in Arizona. Here in these secure retreats the Apaches took refuge from raids upon them by other Indians returning to their usual habitations along the streams when the danger had passed.

That these ancient people grew cotton of some kind is proved by the fact that coarse cotton cloth of very good weave is often found wrapped about the dessicated remains of their dead found in some of the ruins and in protected places under overhanging cliffs where they were not reached by rain or other moisture. Of domestic animals they seem to have had none. The wild turkey they may have domesticated in a way, for its bones are found in the waste heaps about most of the ruins and they probably captured eagles and confined them in rude cages in the village just as do the Pueblos of today.

To the average sightseer these ruins are all classed under the one general term "cliff dwelling," and their builders "cliff dwellers," which is probably as satisfactory a name for them as can be found.

When one remembers that every bit of food, water, firewood and other material used for domestic purposes, even the stones and mortar for constructing the buildings themselves, including the huge rafters formed from tree trunks, "vigas" the Spanish call them, had to be carried up these steep trails where today one must pick their way carefully lest a false step drops them into the depths

below, we are impressed with the position of a people so hard pressed as to make their homes in such places.

Once a young boy, visiting for the first time one of these swallows' nests high up in the side of the cliff, looked down into the canyon below and remarked solemnly, "Oh mother, just imagine being a little boy here and somebody saying, 'Jimmie, run down and get an olla of water for mother, hurry, child.'"

Of all the ruins they have left us to explore the cliff dwellings are by far the best preserved and most complete because of their location, where in this arid region the effect of the elements has been almost negative and there is little or no change from their original condition.

Of 'Cliff' or "Cavate" dwellings there are two distinct types. The usual form of cliff dwellings is a natural open cave or shelf formed generally by wind and weather working upon the comparatively soft stone

until an open space has been created of some size.

Some of these, like the huge shelf upon which was built the great "Palace" of the Mesa Verde ruins in southwestern Colorado, are very large, the palace being a city in itself. Others are merely one room affairs. In some the build-

ers simply erected a wall along the front of the shelf or ledge and the house was done; in others, they built regular rooms with doors and windows.

The Cavate dwellings are a type rather peculiar to the Bandelier Monument region and are almost wholly man made, the formation being known as "Tufa," or volcanic rock and very easily worked. With this material at hand the ancient builders using a piece of "Mal-pais" or other hard rock for a tool with comparatively little labor bored or excavated into the walls of the canyons, rooms which made admirable homes, warm in winter, cool in summer and easily defended against the enemies of those days.

The third is the "Pueblo" or communal type of dwelling and all over the Bandelier monument may be seen some of the finest of this class. The word "Pueblo" is Spanish, meaning town or village, and was given these Indians when the Spaniards first came in contact with them at Zuni, Acoma and other modern pueblos. No ruins in America? Here are ruins by the hundreds scattered over the country so thickly that you can ride all day long and scarcely be out of sight of them. As for



ANOTHER VIEW OF THE PAINTED CAVE

The odd designs on the walls of the cave are in many colors, red, blue and black.

exploring them, there has been so little done that the field is practically untouched. If of a scientific turn permission can be secured from the government to explore and excavate some of them under certain reasonable restrictions. If merely a passerby you can find arrowheads of flint, obsidian and petrified wood scattered about with apparently prodigal hand while pieces of rare pottery, bone ornaments, specimens of turquoise the prized jewel of these people, stone metates or grinding stones, small bone and shell images of frogs and other animals are frequently picked up after heavy rains or found in the loose debris formed of the dust and refuse of ages lying deep on the floors of so many of the houses. Nor is the Canyon de los Frijoles the only one of interest. A few miles north is the great pueblo ruin of Otowi (Ot-o-we) containing over 700 rooms and possessed of no less than ten large circular underground kivas. Here also is the wonderful "Tent city of Otowi" the peculiar conical tent like formation of tufa containing hundreds of caves, natural and artificial, many having been used as dwelling places.

Not far from Otowi is the ancient pueblo ruin of "Puye" (Pui-yea), "the place of cottontail rabbits." Here on top of a large mesa or table land standing boldly out in the midst of a fairly open country, they built a pueblo of worked tufa rock, quarried from the nearby cliffs, a most unusual type of pueblo construction, while the face of the cliff or mesa below is, for half a mile or

more, fairly honey-combed with cavate rooms bored into it. In this the porch idea has been used extensively, almost every room having the row of holes above it indicating a porch attachment. Besides these individual groups there is to be found on every mesa and in every canyon, large and small throughout the monument region, similar ruins in endless and interesting profusion.

Here then, in this new-old Bandeleir National Monument, named for one of the world's greatest ethnologists and archaeologists, who devoted his whole life to a study of the Pueblo and his habitations both ancient and modern, the seeker after ruins peculiarly American can find them to his or her hearts content.

The area contains about thirty thousand acres of practically uninhabited country, covered for the greater part by a fine stand of yellow pine timber, gashed by deep canyons, and fairly well watered. Within its boundaries are types of pueblo ruins not found elsewhere and on no other part of the southwest can they be seen in such numbers and in such close proximity to each other.

As for camping places, during the summer months the Monument has endless charming spots where beneath the fragrant pines and close to springs and clear running streams the tourist may camp at his pleasure in a climate unsurpassed in the world for outdoor life, bracing, invigorating and health-giving. Try it next summer for that tired feeling.

THE PRESENT AND PROSPECTIVE IN FORESTRY

(Continued from page 550)

ber famine most serious is unavoidable. The second and third are matters of investment and persistent effort costing hundreds of millions of dollars and many decades of time. In this regulation of the existing woods we may well follow the Old World and say:

Keep a forest on the land.

Never devastate, never cut large areas of forest bare; never cut, say, over *one-third* of what there is *now upon* the land, and never return to the same area with your cut in less than twenty years.

It might be interesting to follow this suggestion or plan and see where it leads; suffice it to say that if inaugurated

at once we would still have a deficit of over two hundred billion cubic feet at the end of the first twenty years, nearly two hundred billion deficit at the end of second 20 years, and the *growth would not catch up with our cut* before the end of this century.

The matter is serious, and all this talk of optional measures, sectional and state action, all see-saw and compromise, and all talk of more study, more experiments, more learning in silviculture, all these things, are of no avail, they merely delay, they assure continued devastation, aggravate the timber famine already started, and defer by decades the proper rebuilding of our forests.

THE PINES OF THE SOUTH

(Continued from page 558)

trial development of many civilized countries. Enormous quantities of lumber have been harvested from these trees, and yet in spite of the heavy cutting which has been going on for many years they still produce more than one-third of the total lumber cut of the entire country. But expert lumbermen and foresters predict that the major supply of southern pine lumber will be cut off in the next 10 or 15 years. It is now evident that

the present supply will be exhausted before long, and in order that the lumber industry may maintain itself, it is necessary that special efforts be put forth to protect the pine forest of the South from fire and to restore a forest growth upon the many thousand acres of barren forest land now loafing in all parts of the southern pineries.

HOME BUILDING AND WOOD PRESERVATIVES

BY ARTHUR NEWTON PACK

THE United States needs a million more homes, each one of which will be called upon to do duty for at least one generation and perhaps for several generations in addition, and our farmers need a million more farm buildings, as our agricultural communities are surprisingly under-built. There is often too little thought for the repair bills of the future, but most of us honestly want our home to be as well built and enduring as possible. Some who can afford the expense will build with stone, brick, hollow tile or cement, but our forefathers built houses of wood which still stand to-day, and wood seems destined to remain the choice of most home builders for present and future.

The man who puts up a building that will endure really performs a double service, first to himself and, second, through conservation of our timber resources, to the country at large. The importance of combating waste and decay is generally appreciated, yet it is estimated that the people of the United States throw away a hundred million dollars a year in preventable decay of wood alone. The use of preservatives which prolong the life of wood used in home building is no new idea. It is not merely for appearance that we paint the outside of our houses or stain the shingles on our roofs. Paint, however, is merely a protective coating for the surface which must be frequently renewed. It does not kill the vegetable organisms of decay. The true preservative may be advantageously used on sills, door-steps, porch and stable floors and supports,



INSIDE A PRESSURE TREATING CYLINDER

This is the method of applying wood preservatives used by practically all the large commercial companies.



WHERE WOOD PRESERVATIVES SHOULD BE USED

Porch steps such as these could easily have been made to last as long as the rest of the house and at an expense much less than the renewal cost.

roofs, chicken houses, green houses, garages, barns, fences, and all parts of buildings exposed to moisture and decay. It performs a function in preventing fungus growth and rot, more important than any surface coating of paint. Do you know a man whose porch is continually rotting out? It could easily be made to last as long as the rest of the house by proper preservative treatment, and at an expense far less than the renewal cost. The United States Forest Service estimates that more than twenty billion feet, or one-half of all the lumber annually used in the United States, is sub-

ject to rot and may be *profitably* treated with preservative. The decay of wood is caused by living vegetable organisms known as fungi. The microscopic seeds or spores of these wood destroyers are produced in countless numbers from the mushrooms or mold-like growth which appears on rotten wood. Being easily disseminated

by the wind they are present everywhere, and decay which seems to spring up spontaneously really only occurs where the spores have found favorable conditions of heat and moisture in which to develop. They start their destructive work wherever wood is moist and especially where it is in contact with the ground, or with walls and foundations. Accordingly a good wood preservative must be sufficiently toxic or poisonous to the spores of the fungi to destroy them, and at the same time sufficiently permanent to continue performing this function. It must also be readily absorbed by the wood, cheap enough for general

use, easily handled and applied, and not poisonous to man or animal. Many things have been tried as wood preservatives, the list ranging from common salt to skimmed milk, and it is certain that experiments have included several hundred materials. Of these, however, probably not over twenty-five have in laboratory tests been found to be really effective in checking or destroying the growth of fungi, and of this number only three



BRUSH TREATMENT PROCESS

Applying refined creosote to telegraph poles and the same method may be used for all farm lumber.

or four are of recognized value for general commercial use.

The best general preservative developed is coal tar creosote, since it combines in greatest degree the essentials called for. It is a by-product of coal tar, from which so many materials, including dyes, drugs, perfumes, flavoring extracts, etc., are obtained. Creosote is, in fact, a by-product of a by-product, since coal tar itself is a by-product of coke ovens or illuminating gas plants. It is a heavy dark brown liquid which in turn is composed of many chemicals, including naphthalene, which is the common constituent of moth balls, and anthracene, which is of high toxic value. Commercial creosote is of various grades, ranging from that which is left over from the distillation of coal tar to that which has been refined by removing some of the lighter boiling fractions. This means that the oils or products which would evaporate most quickly have been removed, leaving a material which in viscosity and permanence is especially suited for brush or open tank treatment of wood. Another creosote product is derived from so-called water-gas tar, this being in part a petroleum product usually obtained from illuminating gas plants. Other materials with a creosote base or to which other products have been added are sold under various trade names. A few of these have a high preservative value and may be used to advantage.

Another form of creosote is derived from wood tar which is obtained in the destructive distillation of hard woods. This is of materially different chemical composition, and while it has some preservative value, it has not been generally adopted or used for wood preservation.

An entirely separate and distinct group of wood preservatives is made up of various mineral salts, these including sodium fluoride, chlorides, creosole, calcium, copper sulphate and zinc chloride. The last is extensively used in regions of low rainfall, or where the timber is not in direct contact with moisture, and both alone and in combination with creosote has been extensively applied for the preservative treatment of railroad cross-ties in the Middle West. Zinc chloride comes in the form of a crystallized salt, which is dissolved in water and injected into the wood in about a three to five per cent solution.

Of the various preservatives available the best for the home builder, who must treat his wood with a brush or by hot or cold baths in open tanks, is creosote, and of the several grades and kinds the highest boiling oils, by which



BASE OF PILLAR ROTTING

The use of a wood preservative will prevent such decay as is frequently seen in cases such as this one.

is meant those which will show the least loss in evaporation, are best.

The best method of applying preservatives to timber is by the pressure process which is used by practically all large commercial companies. By this means the oil or mineral salt is forced deeply into the tissues of the wood, thus giving a thoroughness and permanence not otherwise attainable. There are various processes, but all use large and expensive apparatus by which vacuums and heavy pressure may be applied in large treating cylinders, which are usually six feet or more in diameter and a hundred feet or more in length. Many of the large railroad companies have their own pressure treating plants, while commercial plants of the same character are located in various parts of the country; especially at or near seaports, which are the most advantageous points for receiving and distributing both creosote oil and lumber.

The small consumer is likely to find difficulty in obtaining pressure treated timber for his needs, with the

exception of fence posts, and therefore must resort to the open tank or brush methods of treatment. The former consists in dipping or otherwise immersing the wood in open tanks containing the preservatives, and allowing it to remain from a few minutes to several hours, according to its condition and the kind of wood. By the use of alternating hot and cold baths, either by removing the timber from the hot bath to the cold, or by allowing the hot solution to cool to air temperature, a much greater penetration is obtained than if a hot solution alone is used. Detailed information on the kind of tanks to build and use, and the various steps in the open tank treatment are obtainable from publications of the United States Forest Service at Washington, and from the circulars of companies which sell preservatives. Whatever the instructions given or the processes used, it is very essential that the wood be thoroughly air seasoned before treatment.

The brush treatment is in effect a thorough painting of the wood with hot creosote, which should be applied with a large brush and in liberal amounts so that all cracks and openings may be filled and the outer surface impregnated to the full limit of absorption. It is often advisable to apply two or more coats, allowing the first to dry before the others are applied. The life of inferior timbers, which decay quickly, can be increased to equal or exceed that of more durable species untreated. But no treatment will be effective on rotten or defective timber and it will not hide or cure defects.

Preservatives have no appreciable effect on the strength of wood, and posts, sills and similar timbers may be used the same as if untreated. The exception is found in the case of pressure treatment where the wood is given a steaming process at high temperature in order to remove the sap, but this would not be encountered by the home builder.

Creosote will burn, but after it is dried into the wood, a stick will not ignite any more readily than if untreated; in fact, tests on thoroughly treated structural timbers indicate that while it will burn with a hot flame and a heavy smoke, it chars more quickly and is less likely to burn entirely through than if untreated. Mineral salts, on the other hand, have very distinct fire resisting qualities, and thereby serve a double function.

Light-colored paints cannot be applied over the surface of creosoted wood, but creosote itself gives an attractive brown stain, and for barns and other buildings of similar character, it takes the place of paint. As a matter of fact, the timbers around the usual home which are mostly in need of treatment, such as sills, the under side of porch flooring, the foundation timbers, etc., are not visible, and can be creosoted without detriment to the appearance of the structure. Creosote is distinctly valuable in checking insects, and is accordingly particularly useful for chicken houses or to guard pig pens against infection with hog cholera.

There is a very rapidly increasing use of preservatives on wood shingles, and the practice is to be highly com-



USES OF WOOD PRESERVATIVES

- Top—Treating fence posts by the open tank process, the posts being first shaved with a draw knife so the preservative easily penetrates the wood.
- Second—Lumber for sills and foundations being treated with refined creosote applied by a power spray.
- Third—In building a chicken coop the lumber is first treated with refined creosote applied much like ordinary paint.
- Fourth—A barn stained with refined creosote—the result a handsome brown effect unaffected by rain or sun.

mended since it not only retards decay, but to a large extent reduces the tendency to curl and loosen, which is sometimes found in the cheaper grades. As creosote forms the basis of most shingle stains, the ordinary process of dipping or painting with the stain is quite satisfactory. There seems to be a good future in connection with the use of fire resistant shingle paints, which combine not only the preservative effect, but also

a high degree of resistance to fire. Any good paint or stain will tend to prevent the formation of cups which, because they are inclined to catch and hold flying sparks or brands, become the worst hazard of a shingle roof; while paints contain large percentages of aluminum silicate having real fire resistant qualities. The Paint Manufacturers Association of the United

States supplies a shingle paint which is both preservative in effect and highly fire resistant.

The cost of a high-grade non-volatile coal tar creosote is somewhat high when purchased in small quantities, although, as a rule, it is less expensive than good paint, and for the particular purposes mentioned is of greater value. The cost of applying depends largely on the facilities at hand, and the apparatus used, the brush treatment, of course, being only the labor in applying. The builder could hardly afford to construct and use open tanks unless treating a considerable amount of lumber, but in some towns the retail lumber yards are operating tanks of this kind, and in farming sections it is often desirable to build and operate a co-operative open tank plant.

IN Vermont farmers the past few years have been setting out a yearly average of 500,000 forest tree seedlings. These are grown in the State nurseries.

PERMITS to build camp fires are required in a number of California National forests this season. In the State of Washington the State Fire law covers this subject. The idea is growing.

Prior to the shutting off of imports in 1914 on account of the war, about half the creosote used was of domestic production and the other half imported. To-day a considerable quantity of European oil is again being brought in, but its increasing use abroad as fuel is restricting the supply, and consumers must depend more and more on home production. Creosote has always been entered duty free, and it would be very unfortunate if a tariff

was imposed at the present time, because the price is already much higher than a few years ago, and anything which adds to the cost will discourage its use and prevent that expansion which is so desirable in order to obtain greater life from the timber used. Wood preservatives play a very important part in the conservation of our forests, for not only do they permit the utilization of



TESTING FIRE RESISTANCE OF SHINGLES

These have been treated with preservative paints, and gasoline soaked waste sufficient to ignite an untreated shingle roof—results in these treated shingles being only slightly charred.

inferior grades of lumber which would otherwise be impractical, but it is obvious that if lumber can be made to give added life, the drain upon our diminishing forest resources will be by just that much reduced. It is estimated that eight billion feet of untreated structural timbers decay every year. If that whole amount were to be treated we would actually save about four billion feet of lumber every year. That is to say, it would render unnecessary the annual deforestation of some four hundred thousand acres of land. There could be no truer or more effective forest conservation, and every home builder who, by the use of preservatives, lengthens the life of his house or barn, performs an effective service to the cause of forestry.

THE State of Ohio, through recent legislation, will join the ranks of those believing in the State entering the field of forest growing.—Forest Patrolman.

THE Third Southern Forestry Congress recently held at Atlanta, Ga., urged Southern States to adopt adequate forest policies and that Government and States co-operate in making appropriations for fire protection.

COMMON AMERICAN MUSHROOMS

BY DR. R. W. SHUFELDT, C. M. Z. S., ETC.

(WITH PHOTOGRAPHS BY THE AUTHOR)

EVERY sensible writer who undertakes to publish an article on mushrooms, generally starts by pointing out the great danger that attaches to the gathering and eating of mushrooms by people lacking the knowledge to enable them to distinguish the poisonous from the edible or harmless species. No warning is more necessary than this, as hundreds of persons have died from eating the poisonous varieties of our mushrooms or toadstools, as they are familiarly called. Nina L. Marshall, in her work, "The Mushroom Book," is no exception to this rule, as she says, almost at the very outstart, that "although for centuries it has been known that some fungi contain most virulent poisons, still, through ignorance of those points which distinguish the poisonous from the edible, frequent cases of poisoning occur in all classes of society. The mistakes resulting in death have been frequent

enough to inspire the timid with an overpowering dread of all fungi; while the damp and grewsome places in which many of them flourish have caused them to be despised by others."

Every word of this can be endorsed by the present writer; and inasmuch as the poisonous species of mushrooms met with in nature are numerous, and often closely resemble some of the harmless ones, one should be as certain of diagnosis of a harmless or edible species as knowing black from white, or arsenic from gunpowder.

When properly prepared, some of our mushrooms stand among the most delightful foods known; and when the forester is serving far from civilization, in a country where many species grow in plenty at certain seasons of the year, it is of great advantage to him to be able to gather, with certainty as to their non-poisonous quali-



FIG. 1—THE DEATH CUP OR DESTROYING ANGEL

This is the name by which the big toadstool in the center of the picture is known. It is a fine specimen of the *Amanita phalloides*, one of the most deadly fungi known, and is frequently mistaken for a mushroom and eaten with nearly always fatal results. Possibly the tall, more slender specimen to the right is also a death cup.



FIG. 3—BOLETUS AND PUFF BALLS

The middle specimen in the upper row is a fungus belonging to the genus boletus, several of which are comparatively safe as food. In fact, the edible boletus (*B. edulis*)—the cepe of France—formerly an imported product, is now largely grown in California. "Funnel-shaped fungi" are here well shown, together with good examples of Puff-balls, of which there are three in the foreground.



FIG. 4—BOLETUS AND BLUSHER

To the left is another small boletus, or one of the fleshy fungi. It is posed in such a way as to show the replacement of gills by the "tubes" in this genus, a specimen of the Orange Cap Boletus (*B. versipellis*), an edible species of this largely poisonous group. The lumpy fungus to the right is a "blusher" (*Amanita rubescens*) in a young stage; this is an edible species of a very dangerous genus.

ties, a mess of these delicious morsels for his morning or evening meal. But, mind you, "there's death in the cup;" and, unless one is certain of the species beyond all doubt, it is decidedly better to stick to the regular camp fare and pass the mushrooms by.

Now that this caution has been set forth as strongly as words can make it, we may, with safety, undertake to describe the pleasure to be derived from a study of some of these curious little sentinels of the woods, and even point out the difference between the edible and non-edible ones.

Some time ago, or early in the autumn of 1919, the



FIG. 2—THE CORAL, AN AMERICAN FUNGI

Of all the American fungi known, none is handsomer or more attractive than the "Coral." In this cut are two different species of them, and surely they are well named. The uppermost specimen is the lavender-colored *Clavaria amethystina*; while below it, in the foreground, we have two examples of the Pale Yellow Coral Fungus (*C. flava*). Both kinds are edible and more or less esteemed as food.

writer and his wife gathered in a few hours over thirty different species of mushrooms and other fungi in a piece of woods adjoining the National Zoological Park, Washington, D. C.; the next day photographs were made, natural size, of nearly all of these. It was a remarkable year for mushrooms, and it was a marvelous sight to see so many kinds flourishing in so limited an area. Later, twenty-three of these photographs were submitted to Mrs. Flora W. Patterson, the Mycologist in Charge at the

Bureau of Plant Industry of the United States Department of Agriculture, who very kindly identified as many of the forms as she could. Where exact identification was not possible, it was the fault of the collector and photographer, who failed to note the colors at the time of collecting, or neglected to photograph or describe those parts so essential, in any species, to absolutely correct identification. One learns a whole lot in this way; so should the reader ever contemplate making a study of our fungi in general, and our toadstools and mushrooms in particular, it will be well to bear these facts in mind.



FIG. 5—THE DELICIOUS MOREL

For ages the fungus epicures have regarded the Morels of the Genus *Morchella* as being among the greatest favorites for the table; they are difficult to differentiate with certainty. This may be the *Morchella conica*, and probably is, as the cup is conical and broader than the stem. Most of the species of this genus may be used as food; but the collector should be very familiar with the specific characters of the various forms.

With respect to their photography, the specimens may be taken *in situ* in some instances, provided the method of photographing that class of subjects be strictly followed and the right sort of plates used. If possible, they should always be taken natural size. They may also be most satisfactorily photographed in the studio, and when one plans to do so, the specimens should be taken up with a broad trowel, placed in a suitable basket, shielded from



FIG. 7—THE YELLOW CLAVARIA

This beautiful and edible *Clavaria* was photographed *in situ* on a mossy bank in a cool woodland in the District of Columbia. It is of a pale yellow color with needle-like tips to its branches. Pale Yellow *Clavaria* (*C. flava*) is sometimes found to be nearly white.



FIG. 6—MORELS, NATURAL SIZE

The cap of this species is sometimes curved at its apex. Delicious Morels may be cooked in all sorts of ways, and they are most "delicious" in all of them. Farmers use them in pot-pies, but the epicure prefers his stuffed with chicken, anchovies, or veal.

the sun and wind, and an immediate record made in the field note-book of all the colors and their exact distribution on each specimen so collected. They must be photographed on the same day they are gathered, their natural surroundings being simulated as closely as possible. It may be said here that, with but few exceptions, all of the pictures here shown were so photographed, the exceptions having been secured as they occurred in nature.

These fungi grow in all sorts of places—in open meadows and pasture lands; along roadsides and water-courses; in many parts of open and shady woods; in deserted buildings where there is but little sunlight and no fresh air circulates; while, finally, many curious fungi grow on old logs, dying trees, and in numerous other

tats, they are invariably interesting—in a great many instances extremely beautiful. None of them can thrive except under certain conditions, as not only is their food peculiar, but they die if warmth and moisture are withdrawn. Consequently we find such species as puff-balls, brackets, and any or all of the so-called toadstools, thriving in various localities where not only their environment is favorable, but where there exist rich soils, as cattle pastures, or plenty of rotting timber and decaying leaves. It is upon such material that most fungi subsist; for, at variance with ordinary plant growths, fungi thrive on organic matter only, instead of on mineral or inorganic substances.

Plants, like every other living thing, die if not more



FIG. 8—FUNGI FATAL TO FOREST TREES

This wonderful group of deep, brilliant orange toadstools are seen to be growing on a bank of pale yellow clay, which is offset by the dark woods in the rear. (Much reduced.) They are *Armillaria mellea*, a parasitic fungus, most fatal to large forest trees. They spring in hundreds from the bark, and the doomed tree soon dies.

places. The species known to be edible are called mushrooms by most people, while all the suspected ones are designated as toadstools.

There is a long myth story as to how the "fairy-rings" are made upon our grass-plats and on grassy hillsides—the curious fungus *Oreades* killing the grass in circles; but, while it is a very pretty tale, and has been enlarged upon in various ways, it is too long to give our readers here. A writer at hand says that "such rings are conspicuous on the lawns of the White House at Washington, and are often to be seen well defined on distant hillsides."

There is a long list of fungi indigenous to this country; and when observed growing in their natural habi-

or less regularly supplied with such foods as are converted into anatomic structure after digestion and absorption. In the case of ordinary plants, their green leafage absorb the gases of oxygen and hydrogen from water, and carbon from the atmosphere, and these, through a certain process of plant physiology, are converted into compounds of sugar, wood, and starch. Thus it will be seen that dead mineral matter is, by certain green elements in leaves, converted into living substances, and nowhere else in nature do we meet with anything approaching such a transformation.

Now fungi subsist largely on foods furnished by elements produced by ordinary or green plants, no small

part of which are the dead leaves themselves. All fungi reproduce from minute spores, resembling the pollen of certain green-leaved plants, and these spores are entirely different structures as compared with true seeds. By careful examination, these fungi-spores will be found to exist in particular localities on the matured specimens of the various families and genera—all the way from brackets to common mold.

Most people who live in or go into the country, know a puff-ball when they see one; they know very well that when it is struck or stepped upon, it sends out a shower of fine, light brown or gray dust. Now this dust is made up of millions of puff-ball spores; and if they are ripe and fall in places presenting favorable conditions for their development and growth, they will, according to circumstances, produce a large number of young puff-balls.

The economics of the mushroom trade and con-

sumption, and the laws controlling the indiscriminate marketing of such products, in that fatal cases of mushroom poisoning may be reduced, are all large questions that need not be taken up in connection with the present article. The interest in all this has vastly increased since

the developments following upon some of the results of the World War. In one of his admirable articles, Prof. Louis C. C. Krieger has said that "to ask a person to gather his own mushrooms for the table, without previous instruction that will enable him to avoid the deadly kinds, is equivalent to, if not worse than, inviting him to put his unprotected hand into a den of rattlesnakes. Indeed, of the two risky performances, the latter would be the safer; for there are at least two known antidotes for rattlesnake venom, whereas there is none for the poison or poisons of the exceedingly common *Amanita phalloides* and its multitudinous forms and varieties." The present



FIG. 9—THE FRUIT OF A PARASITE

An enlargement to about half the size of nature of the group seen to the extreme left in Figure 8. This fungus is nothing more or less than the fruit of a parasite; and when scraped off with a knife or other tool, are soon replaced by fresh groups of the same species. A fallen oak near where these grew had great patches of this fungus growing upon its bark; owing to their brilliant color they could be seen for a considerable distance through the woods, where there was nothing to obstruct the view.



FIG. 10—THE PEPPERY LACTARIUS

A species not always easy to find. It is a typical funnel-shaped fungus, with a peppery taste and a slight aromatic odor. This fleshy, creamy-white toadstool is without a veil or annulus, but with a very short stem, and any part of it exudes a milky juice when cut or broken. It grows from 3 to 12 inches in height, the cap usually spread out; it is a midsummer variety.

writer's illustration of *Amanita phalloides* is here reproduced in Figure 1, where it occupies the central position.

Poisoning from the eating of this species is wonderfully rapid, and the death following it a most painful and horrible one. Some of the species of this genus are non-poisonous; but notwithstanding this, it is far better to be on the safe side, and let all amanitas, or "death cups" as they are called, alone. We find them growing, from April to October, or even later, according to latitude, in open, rich woods, and sometimes in cultivated pastures.

In studying mushrooms, one should first be familiar with the simple structures presented on the part of a typical specimen of an all-round variety. Now in the *Amanita* (Fig. 1), it must be noted that the plant primarily presents the *cap* or top part, and the *stem*, which is the fleshy rod supporting it. Beautiful, radiating plates, most delicate in structure, occupy the under side of the cap; these are known as the *gills*. Often, at the root or *base*, we find an enveloping cup, here well shown in Figure 1, in the *Amanita*, and it is called the *volva* or veil. It is not always present, nor are the gills to be found in all mushrooms. Note, too, in *Amanita*, below the cap, a curious, down-hanging structure, encircling the upper part of the stem. This is the *ring*, and its distance from the *pileus* or cap varies in different species when it is present, or even in different plants of the same species.

"Coral Fungi", which closely resemble some species of the smaller varieties of coral, are always extremely beautiful. Two species of these are shown in Figure 2, the two lower specimens being small examples of the *yellow* form (*Clavaria flava*), much enjoyed by epicures. The upper, lavender-colored one, is *Clavaria amethystina*. There are numerous species of this genus *Clavaria*, and the student-collector should carefully enter in a note-book, at the time of collecting, the color of any particular specimen; the character of the tips or apices of the branches; the taste and character of the spores, and, finally, in what sort of place it was found. When perfect, and growing in dark soil, in open, shady woods, these coral forms of *Clavaria* are most beautiful. In identifying mushrooms, the shape of the cap is extremely

important. When it spreads out like a flatish umbrella, slightly convex on its upper surface, with free gills below, its form is said to be *umbonate*. When it becomes *markedly* convex on its superior surface, we simply use that term to describe it, just as we say it is *expanded* when it is very broad and flatish. Finally, we have the funnel-form cap, which resembles a funnel with its spout passing into the stem. In Figure 3 the two funnel-shaped mushrooms are readily recognized, there being one on either side of the upper specimen of a *Boletus*. Three beautiful puff-balls (*Lycoperdon gemmatum*) are grouped in the lower right-hand corner of this figure. A great many different kinds of mushrooms

are grouped in the genus *Boletus*, referred to above; indeed, so long is our list of them that to even mention the forms by name would occupy altogether too much space in this connection; they belong to one of the groups of fungi that have *pores* instead of gills. On a vertical section of the cap of a *Boletus*, these pores appear like a lot of vertical little tubes, packed closely together, the whole forming a sort of dense, spongy mass. This is well seen in the small *Boletus* to the left in Figure 4. Besides the many books, monographs, and special illustrated articles that have appeared on these fungi with pores, are two very famous ones, the first being the New York State Museum Bulletin No. 8, of the year 1888, in which 110 species are described. It is entitled "Boleti of the United States," and, if not exhausted, may be purchased from the

State librarian at Albany, N. Y. Mr. Edmund Michael has also published, in German, his "Fuhrer fur Pilzfreunde," with nearly 70 colored plates. Our own Department of Agriculture at Washington has issued numerous works on this subject, as Bulletin 796, by Flora W. Patterson and Vera K. Charles on "Some Common Edible and Poisonous Mushrooms," and the Departmental Bulletin 175 on "Mushrooms and Other Common Fungi." Then Nina L. Marshall, in "The Mushroom Book," gives a list of writers on this subject at the close of her volume. She has an excellent chapter on these *fungi with pores* that should be carefully read by the student of mycology; it is too extensive to give more than this



FIG. 11—A TALL TOADSTOOL

This is a specimen of *Agarius silvicola*. Its gills are dark colored and its stipe or stem somewhat bulbous. (Half natural size) The collar of this specimen is pressed up against the stem. Most of the species, if not all, of this genus are edible. Nearly every variety of brown-spored toadstool with free gills is in this group.

reference to it here. After a little study it will be found that the group is not so very complicated, while some of the forms are beautifully colored and furnish elegant subjects for study.

No account of our mushrooms would be complete were no mention made of the famous Morels (Figs. 5 and 6), especially those constituting the genus *Morchella* of the family *Helvellaceæ*. All the species of this group are edible, and most highly esteemed by epicures and others; indeed, the Morels are prized above all other spore-sac fungi known to us. There are several genera of them, and no species are better known than the delicious morel, *M. deliciosa* and *M. esculenta*.

The writer has frequently observed these morels growing, in the month of May, in the woods in the neighborhood of Washington, D. C., and the specimens shown in the accompanying reproductions of photographs were collected there. Nina Marshall says of them that "all the species, when young, are of a buff yellow, tinged with

brown, but later they are darker. The stems are rather stout and hollow, white or whitish in some species, and attached to the cap at the apex only; but in others attached to the rim as well." Sometimes, in old orchards, after a shower in April, these morels will suddenly spring up in loose groups, the individual plants being a few feet apart, and each specimen from 2 to 6 inches high. There is no mistaking them for any of the poisonous species by an intelligent collector, and the time mentioned is the time to get them.

Sometimes we meet with mushrooms that are so brilliantly colored that, when growing in masses and nothing chances to be in the way to obstruct the view, they may be seen in the woods a long ways off. The intense deep orange species, here shown in Figures 8 and 9, is an excellent example of these. This particular fungus is harmless enough on a clay-bank, but it by no means confines itself to such localities; for, if the truth be known, it is one of the deadliest of all the parasitic fungi. They sud-



FIG 12—SPECIMENS OF DIFFERENT KINDS OF TOADSTOOLS

The caps of some of these are no bigger than one's little finger nail. This is true of those seen here at the top of the figure, that is the little army of brilliant orange mushrooms there figured. This is *Omphalia campanellus*, and they grow in patches in deep, shady woods, often covering a square yard of ground. The lower three to the right are fine specimens of the Wood Mushroom (edible) *Agarius silvicola*. The remaining four may be young "Death Cups." These are much larger than *Omphalia*.



FIG. 13—SPECIMEN OF THE BRACKET FUNGUS

Most children know this Bracket Fungus, for the reason that they can draw on its white surface, which is porous and turns dark brown with the slightest scratch. This thick "bracket" is found growing in groups on rotten logs and dead trees. The concentric rings, so plainly indicated upon it, each indicate a year's growth.

denly infest the bark of some big, handsome tree, and rapidly appear in ever-increasing groups. The death of the tree in time is certain; and should one undertake to kill the pest by chopping them off, others soon spring up to replace them. Indeed, these mushrooms are nothing more or less than the fruit of a parasitic fungus of a very harmful variety. They are certain death to any of our orchard fruit trees, as, once starting to produce, they may cover nearly the entire trunk for 8 or 10 feet up from the ground.

Many "bracket-fungi" are likewise parasitic, and deadly enemies of some of our best forest trees. To break them off in no way eliminates the cause of destruction, for the matured "bracket" is but the fruit of the parasite, and will soon reappear after such treatment.

Professor Krieger, in speaking of the bracket fungus known to science as *Polyporus applanatus*, says: "Provided with nothing more than a good fresh specimen of this fungus and a stylus in the form of a sharp-pointed branchlet, conveniently picked up at his feet, the artist

mycologist may proceed to sketch the landscape. If he has the ability of a Seymour Hayden or a Pennell, the result will compare favorably with a good etching. After the fungus is thoroughly dry, the picture is permanently fixed, and it may then be set up in the summer bungalow to recall a day pleasantly and profitably spent."

Should it enter the head of any forester to gather mushrooms to cook or otherwise prepare for his own consumption or that of his friends, he should never undertake to do so unless he is practically an expert in recognizing with absolute certainty all the species known to grow over the area where he intends to collect them. Unless he possesses such knowledge, it is far wiser for him to confine himself to other food. Many of them are, as we know, very delicious; but the chances of running up against poisonous varieties are so great, the eating of them so fatal, and the resulting death so horrible, that it is much better to avoid them entirely. There is a large literature upon our mushrooms—all the way from the common edible mushrooms of the markets (*Agaricus campester*) to the vilest

of all the death-cups; but it should all be studied and *used* with the greatest caution.

In a brief article like this one, it will be quite impossible to give any rules for gathering the various kinds of edible mushrooms; in fact, were the article three times its length, it is far safer not to do so. However, should any one of our forest lovers have a leaning towards the study of these fungi—so many of which are so fatal to the best trees of the forests and our orchards—it is well to know that an entire division of the United States Department of Agriculture is given over to the consideration of these growths in nature. Bulletin No. 15 is an excellent example of these publications, while every civilized country on the globe has contributed to the literature of this subject.

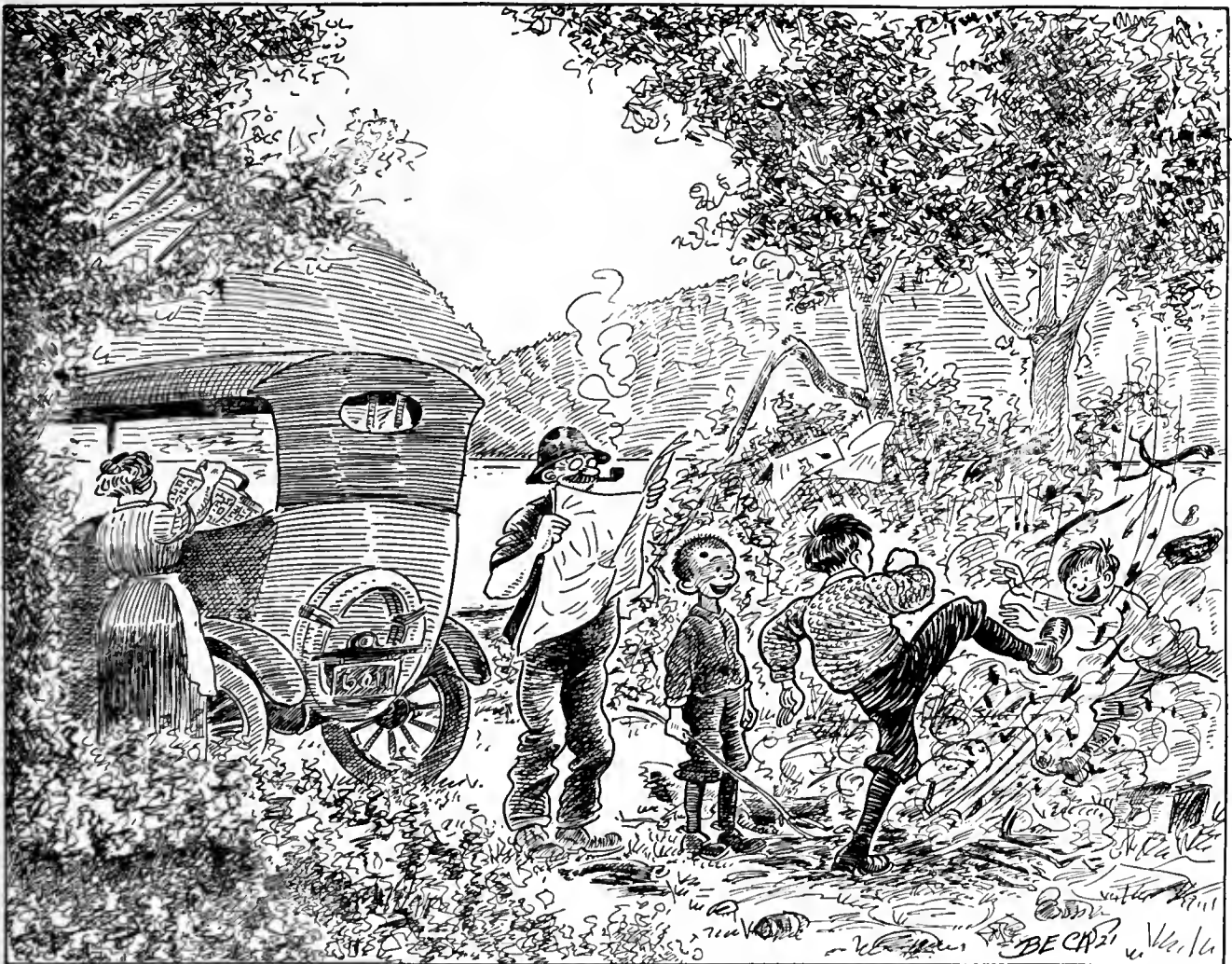
So dangerous is the poison found in some of the fatal Amanita family of mushrooms that, as Dr. W. W. Ford has shown, it can only be rendered inert through long boiling in the strongest acids known to the chemist.

The part played by fungi in nature reads like a fairy-tale; so fascinating has it been found to be, and so intense is the desire of many people to be able to diagnose

the various fungi—including all known species of mushrooms—found in this country, that we find in many of our large cities mushroom clubs, organized for no other purpose than to cultivate the science of mycology, and to extend the knowledge they acquire in such a way as to reach and be of use to the greatest number of people.

Many fungi are the deadliest of all known enemies of trees and the various kinds of grain. The "diseases" are known as rust and as blisters, such as the "black-stem rust" that a few years ago destroyed tons upon tons of wheat in this country and in Canada; while all will remember the damage done to the chestnut trees by still another fungus ten or twelve years before, which destroyed—indeed, near exterminated them. Now comes the danger to the pine through the "White Pine blister"—a most fatal form of fungus, demanding all the attention that the expert possesses of such enemies to successfully combat, in that thousands of acres of pines shall not be exterminated in various parts of the country where it has made its appearance. It, too, is a fungus and a cousin of the toadstools.

DOWN THE ROAD



One way to leave a camp fire so that it will make a forest fire

FOREST GUIDE DEPARTMENT

SOLAN L. PARKES, EDITOR

THIS DEPARTMENT IS CONDUCTED ESPECIALLY TO CONSERVE AND PRESERVE THE FOREST AND THE LIFE THEREIN, WITH THE YOUTH OF THE COUNTRY AND THE YOUTH WITH THE FORESTS.

CAN girls be forest guides? Certainly! Girl forest guides can help conserve and preserve the forest, just as well as the boys. For the forestry problem can only be solved if we all co-operate.

In the spring of 1915, I came across a tract of what formerly had been agricultural lands; but which had been taken over by a city for the protection of the watershed. All over sumac, some wild cherry and other growth could be noticed. It took some time, in fact, several months of effort to convince the city fathers, that these lands should be reforested with worthwhile trees, that would not only give a greater protection to the watershed, but that at some future day would also give a timber supply. These lands surround a beautiful lake.

* * *

After the city fathers agreed to the plan proposed, an order was placed for trees. The next problem confronting us was the planting. The matter was presented to the principal of the Girls' High School, who immediately informed us, with a smile, that the girls would not help. We begged to present the matter to the girls. The privilege was granted, with the result that four hundred and thirty High School girls, that afternoon, planted eight thousand trees. The following year, 1916, we again appealed to the same school. This time seven hundred and seventy girls responded. Today there are now growing, practically two hundred and fifty thousand trees on the lauds surrounding the lake. It was but a few days ago that the superintendent in charge of this department stood by the side of a tree, which when planted in 1915 was but three inches above the ground, and now measures eight feet five and one-half inches.

The outcome of the 1915 response of the four hundred and thirty girls brought about annual tree planting campaigns elsewhere, and as a result several million trees have been planted on non-agricultural lands where no trees were growing formerly, all of which I doubt would have happened had this girl leadership not been given.

No further argument is needed in this locality about the girls being able to render valuable service in the cause of forestry, for on more than one occasion I have found them assisting on the forest fire line, extinguishing forest fires, and time and again they have reported fires, which otherwise might have done considerable damage.

The girls have entered with the same spirit as the boys in bird house building campaigns, in the protection of the wild flowers, and on many occasions have established feeding stations, during the cold winter months, to preserve bird life, when no other food could be secured by our feathered friends. * * *

Girl Forest Guide Troops can be organized all over the nation. Those who are interested to become leaders or members of troops should immediately address the editor, either care American Forestry Association, 1214 16th Street, Washington, D. C., or Box 9, Reading, Pennsylvania. The details of the plan for the organization of troops are almost completed, and we expect soon to present them to the public, in order that each of us may do our bit in helping to conserve and preserve these God-given nature



THE GIRL PLANTERS

This is one field where "equal rights" prevail. In other words, it is just as right for a girl to be a tree planter as for a boy, and these girls proved it by planting eight thousand trees in one afternoon.

gifts. The same camping plans, proposed in the June issue, will hold equally good for boys and girls, except that the personal equipment and requirements naturally must conform to the needs of the user. Girls have proved their right to enter the lists with boys as A-I tree planters.

PERENNIALS

BY F. L. MULFORD

WITH a yard well planted with trees and shrubs about the borders and a good turf in the center there is still something lacking to make the home surroundings the most attractive possible. Although green foliage is the most important single factor in landscape adornment flowers wonderfully brighten the effect. Many of the shrubs used for ornamental planting have in their season a wealth of attractive flowers, but, as a rule, they do not last long. For this reason it is frequently advisable to supplement the shrub plantings with other plants that will add to the floral effect. This can be done by putting in annuals every year, but this requires much labor and attention to attend to all the details at the proper season and the results can only be enjoyed in the summer and fall. The most satisfactory way of obtaining additional floral effect about the home grounds is to use herbaceous perennials in connection with the shrubs, and often it is possible to use them in a flower garden at some appropriately secluded place about the grounds. Such a garden need not be large to be enjoyable, but it should be somewhat shut off from the street view so as to have a privacy comparable to that of the living room of the home. If it can be viewed from the living room, the dining room, the porch or some other much-used portion of the house so much the better. In the case of over nine-tenths of the homes of the country the most important place for a flower garden or other attractive view is opposite the kitchen window, where the housewife stands to do so much of the work for the benefit of the family.

Such a garden may take many different forms, according to the conditions and the preferences of the gardener. Some times the garden may be rectangular or square, again it may be round or oval, or it may be irregular in shape or be mere strips on the sides of a path or par-

allelling a wall or fence. It may appropriately include annuals and also woody plants. Its purpose may be to grow flowers for cutting, it may be an end in itself, or it may be a combination of the two.

When planting perennials, whether among shrubbery, around the lawn or in a special garden, it needs to be kept in mind that most of them require more care and attention than well-established shrubs need. They do not have the same ability to suppress their undesirable neighbors by shading them to death, so that they require more attention as to weeding and cultivation. Again

many of them are such rampant growers that they may be said to be their own worst enemies, for they so overcrowd themselves that they have to be thinned to do their best. Further, they need an abundance of plant food, and this is often best supplied by lifting the plants, spading in a good coating of manure and resetting the plants. On the



A BEAUTIFUL BASE PLANTING

This herbaceous border on the edge of the lawn softens the ground line of the house and is effectively made up of physostegia, or false dragon head, tiger lily and marsh-mallow, with hardy phlox in abundance and the annual portulacca in front.

other hand, there are many herbaceous perennials that need to be left as severely alone as do rhododendrons.

There is a host of kinds with the widest range of preference as to conditions under which to grow. Some prefer sun, others shade, some prefer dry situations, others bogs, some clay, others sand, some are tall and others short, some are showy in flower others dainty or inconspicuous. Of all this multitude of kinds but few are very widely cultivated, but these few kinds have been developed into many varieties, in some cases running into the hundreds, as with peonies. It would seem as though a plant must be available for almost any conditions under which it is desirable to grow them.

The beginner will do well to select at first from those kinds that are most widely grown and are best known and then, as experience is gained, less common kinds can be added. This holds equally concerning varieties of



A VERY HANDSOME BORDER OF PERENNIALS

Hardy phlox is the most important feature of this striking and distinctive border, flaunting its brilliantly colored blooms against a quiet green background of mixed planting. Phlox is one of the showiest as well as most satisfactory of the perennials.

those plants of which there are many offered. This is not meant to suggest growing plants of which the names are not known, just because they may be commonly grown in a community. An effort should be made to have only named varieties of those plants that have been cultivated so long that named varieties have been put upon the market. By growing named kinds greater satisfaction comes to the gardener in the same manner that knowing the names of those with whom we mingle in a business way or socially gives greater satisfaction. Then, too, it is easier to talk with others interested in growing flow-

FIRST CHOICE

Le Cygne	Medium Early	White
Soulange		Salmon center to bluish
Therese	Medium Early	Violet rose to white
Mme. Jules Des-sert	Midseason	White shaded flesh
Tourangelle	Midseason	Flesh tinged salmon
Festive maxima	Early	White
Lady Alexander Duff	Midseason	Pale rose
LaFrance	Medium late	Rose white
M. Jules Elie	Medium	White
Sarah Bernhardt	Late	Pale mauve rose
Walter Faxon	Midseason	Bright rose
Baroness Schroeder	Medium	Flesh white
Mme. Emile Lemoine	Medium	Milk white
Marie Crousse	Midseason	Pale lilac rose
Milton Hill	Late	Pale lilac rose

ers, so that information is passed along. Although many kinds of these plants are grown readily from seed it would be well for the beginner to buy plants until experience is gained in handling them. Of course, named varieties can only be secured by buying plants. With those plants that vary much and thus have produced a large number of varieties there is much of interest in growing seedlings to see if something better than the things already being grown can be produced. This, however, is only desirable for the experienced gardener who has already grown a large number of varieties of the plants in which he is inter-



WITH EVERGREENS AS A BACKGROUND

This herbaceous border is very good, with some annuals in front of the evergreens and groupings of hardy phlox, zinnia, coreopsis, aster, false dragon head, and a small hollyhock and gaillardias in bloom interspersed with plantings of iris, columbine and hardy chrysanthemums.

ested and so knows what is already available. In many parts of the eastern United States the transplanting of spring and summer flowering perennials may be done either spring or fall, preferably the latter where they will stand the winter. In the neighborhood of New York City, in the southern parts of Pennsylvania, Ohio, Indiana, and Illinois the latter part of August and September is a good time for this work, if there have been good rains so that the ground is well supplied with moisture. North of this transplanting would best be done in spring. Farther south the season would be later, beginning about a month before the usual date of the first kill-

SECOND CHOICE

Karl Rosenfeld	Midseason	Dark crimson
Rosa Bonheur	Midseason	Light violet rose
Albatre	Midseason	Rose white flecked crimson
Avalanche	Late	White — some cerise flecks
Alsace Lorraine	Late	Cream white to yellow
James Kelway	Early midseason	Rosy white
Asa Gray		Pale lilac (Very distinct variety)
Grandiflora	Very late	Rose white
Marguerite Gerard	Late	Pale pink
Marie Lemoine	Very late	White
Albert Crousse	Late	Rose white flecked crimson
Claire Dubois	Late	Violet rose tipped white
Eugene Verdier	Late	Pale hydrangea pink
Mme. Auguste Dessert	Early medium	Violet rose
Mme. Emile Galle	Late	Deep lilac white
Venus	Midseason	Pale hydrangea pink

ing frost, and stopping two months before the ground freezes up, in those regions where the ground freezes more than an inch or two deep. Where the ground does not freeze transplanting may well be done as soon as the ground is wet enough in the fall to insure a good root growth. Moisture rather than temperature is likely to be the determining factor in the warmer parts of the country. Herbaceous perennials have been more grown in those parts of the country that have a climate similar to western Europe than elsewhere, largely because our people have traveled much abroad, have admired the flowers there, and have come home and

tried to grow the same things here. The result has been that in those sections with cool and moist summers the European plants have succeeded and in the regions of hotter, drier summers the European plants have failed and, therefore, herbaceous perennials have been said to have failed because proper kinds for the conditions were not selected. This shows the need for selecting kinds suitable to the region. Because gardening has been practiced longer under moist conditions than in drier climates there are more plants available for such regions than for drier situations but with care in selecting for the drier countries much better results can be obtained than is generally realized.

When a resetting of the perennial bed is determined upon, the plants should be lifted with all the dirt possible and be lightly "heeled in" in a shady place, or if this is

the place from which the leaves of stemless plants arise and the roots descend. A strawberry plant is a good example of a plant with a crown. If this should be planted so that it becomes covered with soil the plant will die, while, on the other hand, if it is planted so that a portion of the roots just below the crown are exposed to the air and consequently dry out then again the plant will be killed. On the other hand, plants with corms, root-stocks or tubers that are more or less stemlike, roots should be planted with the growing end or buds two or three inches under ground. A plant with bulbs, that is, enlargements composed of a number of leaflike parts wrapped about one another, should usually be planted two or three times as deep as its own diameter.

In those regions where there is severe freezing weather or alternate freezing and thawing for a greater depth than



THE APPROACH TO THE HOUSE

This is a place where the hardy perennial may be used most effectively—in a herbaceous border along a driveway as the planting can be done so that one or two of these showy plants is always in bloom. In this bed mallows and phlox are just now at their best.

not available as nearly a shady place as possible and then covered with a wet burlap. Well-rotted manure in liberal quantities should then be spaded into the soil as deeply as possible, for most plants about as much manure as can be worked in. The quantity of manure used may seem extravagant, but it must be remembered that the ground is being fed for three or more years of heavy demands as no new supply can be worked in until the plants are again dug for resetting. After this thorough preparation of manuring, spading, and fining of the surface the plants should be taken from the place where they have been "heeled in," divided into pieces appropriate for the kind and those portions selected should be at once reset with the crowns of those that have crowns just level with the ground. A crown in this sense being

an inch or two, the perennial bed should be covered with a good coating of manure as soon as the ground freezes well in the fall for the purpose of protecting most plants from alternate freezing and thawing, although for a few it is protection from the cold that is necessary. As soon as freezing weather is past this covering should be removed from the plants and usually as much as possible should be permitted to remain on the bed between the plants to act as mulch and for the benefit of the little remaining plant food that may be in it.

The cultivation of many of the kinds should be by clean hoeing, but others need only the pulling of weeds near them, as they do better without the soil being worked about the roots. Some, in fact, are most at home under wild or semi-wild conditions, so that all these require is

to have removed any specially obtrusive plants that seem to be taking more than their share of the room.

As already stated, there is such a wide range of kinds that it would seem as though any tastes and conditions might be satisfied. Among the commonest of the spring flowering perennials is one of the bulbs, that is the common daffodils or *Narcissus*. There are many kinds ranging from white to deep yellow, with some modifications. The yellow kinds are most common and are most easily grown throughout the northern states. They behave as most perennials in regard to over-crowding themselves to the extent of requiring to be dug and replanted about every three years. The bulbs should be planted in October or farther south in November. Two splendid varieties are Emperor, a deep yellow, and Empress, a deep yellow trumpet and pale yellow perianth. Double narcissi are not satisfactory.

Iris give a long season of bloom and a great variety of heights. Some of the early kinds grow less than six inches tall, while the Japanese Iris, a summer kind, grows to a height of four feet and more under favorable conditions. Some of these dwarf kinds are *Cristata*, four inches; *pumila*, not much taller; *nudicaulis*, not over twice as tall, all of which are deep purple. Later come the so-called German Iris, an unknown mixture of several species. In the neighborhood of Washington these bloom during May, with blue and white and mixtures with yellow predominating. For landscape effect the common blue flag is not surpassed in color and is as satisfactory as any, unless it is to be viewed at close range. Mrs. H. Darwin, seen at a little distance, is practically white, while Madam Chereau is white, pencilled with blue. Iris pseudo-acorns, the common yellow water flag, is a handsome yellow species that does well on moderately dry ground and is one of the few iris that will grow in standing water. A distinct type of iris of about the same height and of a little later bloom, with narrow foliage and smaller flowers, is the Siberian Iris, of which there are several varieties in white and blue. The flowers of the species are equal in color to the improved varieties, but are smaller. It is a very decorative plant. The Japanese Iris comes later than those mentioned and has the largest flowers, as well as being the tallest. It succeeds well on upland but does best in moist but well-drained soil. It also responds to an abundance of fertility and does not object to manure only partially rotted. Heavy mulching with manure is a benefit. With the other irises and the German Iris in particular, mulching with manure is liable to induce a rot that is quite destructive, therefore, the manure that is applied to these plants better be well rotted and be worked into the ground promptly in small quantities.

Among the showiest of the late spring and early summer perennials is the peony. These come in rose reds and white with intermediate shades. The flowers are large and although the blooming season is rather short, especially where hot-dry periods are likely to occur during flowering, yet they are most satisfactory in landscape

planting, as the foliage remains good throughout the season, in addition to the plants making such a show when in flower. Like the iris, the plants are best set in the late summer or early fall, although they may be set in the spring, but the flowering results are likely to be postponed a year by late planting. When once planted, peonies may be permitted to remain without dividing or resetting for a good many years, plants being known that are still doing well after twenty years. They do not come to their best until after iris, daffodils and many other plants need replanting.

After frost has killed the tops, but not before, they should be cut off and when the ground freezes a good application of manure should be given, which should be worked under in the spring. They are gross feeders and respond to plenty of fertility and do not require that it be as well decomposed as many plants require.

Varieties are numbered by the hundred, but the American Peony Society is trying to eliminate the poorest by a comparison of varieties as grown under different conditions. In selecting varieties it is not necessary to always choose the highest in price, as frequently good varieties are moderate in price because they are free growers and are not of recent introduction.

The lists given here represent the combined judgment of a large number of peony growers in all parts of the country, as collated by the American Peony Society.

With and after peonies come perennial poppies, coreopsis, gaillardias, pyrethrum roseum, fox-gloves, sweet Williams and other hardy pinks and hardy larkspur or delphinium.

Later come the hollyhocks, Canterbury bells, Chinese bell-flowers and yuccas, followed closely by the hardy phlox, of which there are many kinds. This is probably one of the first plants of which there are a large number of named varieties on the market for the amateur gardeners to begin growing for themselves. They are easily grown from seed planted as soon as gathered, although if kept for a few weeks it is difficult to get it to germinate. The variation in seedlings is great, but the commercial value of new and attractive forms is not sufficient for these to be a temptation to name and put them on the market, although it makes it possible for each gardener to have a distinctive form or forms upon his own grounds.

Along with the phlox comes the mallows, marshmallows and in the South, hibiscus, rather coarse-growing plants, attaining a height of five feet, but having showy flowers shaped like hollyhocks and rose of Sharon, in white and shades of pink, and red. Some of the lilies bloom at this season, too, also *physostegia*, or false dragon head, followed by *montbretias*, showy, bulbous plants from the Cape of Good Hope, growing two or three feet high and having spikes of orange or scarlet flowers. Their foliage is somewhat similar to Siberian Iris. At this season also comes the *tritoma* or red-hot poker plant. This has foliage more like yucca, with orange or scarlet flowers on tall spikes. These last two

plants are not so well adapted north of New York and Columbus, Ohio. Later about the first of September, come Japanese anemones, among the most dainty and handsome of our perennials. This, too, is the season of our common wild aster, a most worthy plant for the perennial garden. The English have developed several named varieties with much larger flowers than the average of our wild specimens. Golden rod also comes at this time, while a little earlier there are cardinal flower, joe-pye weed, and iron-weed. The season closes with hardy chrysanthemums, with many forms, from small and large singles, tiny double buttons and larger fully

double flowers, some of which are inclined to be quilled. The colors range from deep rose through pink to white, lemon, yellow, bronze and brick red. There are many named varieties, but unfortunately a large proportion of these are not entirely hardy in the more northern sections, and so require special protection to have them winter satisfactorily. Then too, early frosts or rather freezes may in about one year in three injure the flowers, especially of the pink and white varieties of the daisy-like and somewhat quilled types. New early flowering varieties are being constantly introduced. In the South these plants do splendidly, but with such little care that their value and possibilities are not appreciated.

CONSERVATION

I will not break this blossom wantonly,
Its smile and fragrance it has given to me;
Some other day the children will come here
And find this blossom's children blooming near.

I pray that God shall guide me day and night,
Keep young my heart and make my footsteps light,
That neither wayside bloom nor drowsing bee
May know of anguish or of death through me.

I would not mar a line that Raphael drew
That other eyes may share its beauty, too.
Nor spoil a bough within the leafy wood,
Nor change the sunset glories if I could.

A robin! hark! it sings in yonder tree,
Nor tree nor bird shall suffer harm from me:
Some other day the children will come here
And find that robin's children singing near.

—LEANDER GOETZ



(Gillam Service)

WORLD'S LARGEST FIG TREE

Not growing in the Orient, as might be supposed, but right here in the United States, out in the San Joaquin Valley, near Fresno, California. Last year it produced two tons of marvelous white figs, which netted its owner over \$500. This year the crop will be larger and even more valuable, as the tree is constantly growing and producing more fruit. The tree really consists of five trees which were planted in a circle with one in the middle. At a certain age the tops were grafted together, making one tree. As fig trees live to a great age and continually increase their growth, it is figured that 100 years from now this tree will be producing \$1,500 worth of fruit annually. This picture shows the base of the tree and its owner, Roy DeWirst.

GETTING EVIDENCE ON FORESTRY NEEDS

ALL sides of the forestry situation have been heard and discussed by the National Forest Policy Committee of the Chamber of Commerce of the United States which early in August completed a tour of the East and West to gather information in order to make a report on the need of forestry legislation.

Meetings were held in New York, Chicago, Minneapolis, Seattle, Spokane, Tacoma, Portland and San Francisco. At these meetings foresters, lumbermen and others testified and the committee returns with a great fund of valuable information. Its report is awaited with unusual interest on account of the effect it will have upon Congress in its consideration of forestry legislation.

A particularly gratifying feature of the hearings is expressed by Chairman D. L. Goodwillie, of the committee, who says:

"It is indeed significant that with Oregon and Washington owning fifty per cent of the remaining standing timber in the United States, the lumbermen operating in these forests have expressed with such clearness and vision their willingness to co-operate with the federal and state governments in making these forests permanent. Our conference showed clearly that the far-sighted lumbermen of this district feel the time is here when a national forestry policy must be formulated—not in response to local demands alone, but to the larger demands of the nation. The national forestry question has been brought to the fore by the predicament of states like Pennsylvania, which at one time was a great exporter of lumber, but today imports ninety per cent; by the serious shortage of pulp wood in New England, and of hardwoods in numerous industries. While types of forests, fire hazard and methods of logging vary in the different districts, the interdependence of our great industries on supplies of lumber and timber from all sections makes this a national problem."

Members of the committee expressed themselves as being surprised with the steps which the lumbermen of the Northwest have already taken along lines of fire protection. Also at the evident willingness of the lumbermen to co-operate with those in the East who are desirous of developing a national policy. Some of the committee had been led to understand that the attitude of the Northwest was anything but friendly to this idea.

Col. W. B. Greeley, United States forester, at the Chicago meeting gave a remarkable presentation of the entire forestry situation in the United States. He pointed out that we are cutting timber four times as fast as we are growing it and that 61 per cent of all the remaining timber in the United States is west of the Great Plains. Fifty per cent of all hardwood is in the southern Mississippi States; 61 per cent of all the remaining softwood is on the Pacific Coast.

He said the burden of increased freight expense is exemplified by the fact that Chicago alone pays yearly \$22,-

500,000 for extra freight expense on lumber as compared with what the freight on the same amount of lumber would have cost thirty years ago.

"This expense might have been obviated," said Col. Greeley, "had the great timber states in the northern part of the Mississippi Valley applied the principles of forestry in former years, for there are millions of acres of barren lands and lands with poor stands of timber in these states which would now be producing forests had forestry been practiced at the right time.

"Some day we must pay the bill and at far greater cost than if we start at once to develop our forests. The mounting expense of higher freight due to transporting the lumber for greater distances might better be applied to developing our forests nearer at hand."

A. L. Osborn and C. H. Worcester raised the question regarding the effect on the lumber industry because of their having to cut forests on certain regulations, pointing out that an increase amounting to \$2 in the cost would practically be equivalent to confiscation.

Col. Greeley declared that the cost would be passed on to the public, but Mr. Worcester did not agree, stating that the cost of producing lumber unfortunately did not control the price.

Col. Greeley said that the experience of the government in its own forests where forestry methods have been applied, furnished a rough basis for comparison. He thought that an average figure of \$1 per thousand might cover the cost. As 52,000,000,000 feet of timber are used in the United States every year, this would mean a total extra cost to the public of only \$52,000,000, which as it would be equally distributed, would be an insignificant tax to pay for the preservation of our forests.

As a safeguard to the lumbermen, Col. Greeley advanced the idea of the commission used by Sweden. Commissions of this type, representative both of the lumbermen and the public, would be set up in the individual states and would hear special cases of complaint regarding unreasonable regulation and provision could be made for appeal from the findings.

Prof. Filibert Roth, Dean of the Forestry School, University of Michigan, predicted economic disaster unless the government take steps immediately to create forests. He cited the experiences of European countries. Germany was originally a forest land but permitted her forests to become brush lands and it took her six centuries to restore the forests. It is his idea that in the very nature of things, timber should be grown by the public. He insisted that the extra expense of changing our methods of lumbering and growing new forests should be borne by the public. He advocated a constitutional amendment which would give to the federal government unquestioned police power to regulate the forests in the states.

Ex-Congressman James W. Good pointed out the need of educating the public on this important subject. He hinted that this might be a difficult time to get Congress to appropriate money for reforestation on account of the universal demand for retrenchment in government expenditure. Major W. H. Hall pointed out four requisites of the National Forestry Policy, first: increasing the national forests; second, protection from fire, insects and fungus; third, more complete utilization of wood, and fourth, reforestation involving regulation of timber planting.

"Economic conditions throughout the country require that lands unfit for agriculture and suitable only for timber growing should be put to work, and Minnesota has several million acres of such land," Governor J. A. O. Preus told members of the National Forestry Policy Committee at its hearings in Minneapolis. "Timber growing by private individuals is rendered almost impossible because of taxation," continued Governor Preus. "Either these worthless lands must be gotten into the hands of the public or some method of relief from taxation be devised. This is going to be a difficult problem because there is an increasing disposition to tax natural resources such as iron, coal and timber by means of the so-called Severance Tax."

State Forester W. T. Cox, of Minnesota, stated that fire protection had proven effective and could be made more so by increased expenditure.

J. M. Hughes, Land Commissioner, Northern Pacific Railroad, urged that tax laws be amended so that the burden from that source would be lessened. The average tax paid by the Northern Pacific on its timber lands was 1½ cents per acre ten years ago and last year 16 cents, the total bill paid the government being \$800,000. Mr. Hughes added that there is no indication that taxes will stop increasing. Sixty per cent of their timber holdings are at present inaccessible and will not be accessible for thirty years. If the present rate of taxation should continue it would not be practical for the company to hold this timber.

T. B. Walker, the largest individual timber owner in the United States, testified at length and pointed out the weaknesses of our federal land laws as compared with the laws of Canada. He pointed out that it was not the lumbermen but the laws that were responsible for the wastefulness of American methods. Mr. Walker stated that he did not believe trees could be grown except by actual planting. State Forester Cox and others present took issue on this point, and cited cases in Minnesota where good reproduction had been obtained by methods of cutting and forest regulation.

The meeting developed an important question regarding present freight rates, it being pointed out by Mr. Gilkey and others that a large amount of low grade forest products were not marketed because in many instances the railroads charged as high rates on these low-grade products as on high grade lumber, as much on sawdust and shavings as on sash and doors.

Leading lumbermen, timber owners and operators of the Inland Empire, to the number of forty, met the Committee at Spokane. An interesting discussion brought out many points of value to the Committee. One of the principal speakers was Mr. A. W. Laird, of the Potlatch Lumber Company, who gave a picture of Idaho conditions and emphasized the willingness of the lumbermen to co-operate with the government in establishing a forestry policy which would be for the benefit of all. This same idea was strongly emphasized by Mr. Huntington Taylor, of the Rutledge Timber Company; W. D. Humiston, of the Potlatch Lumber Company, Idaho, and others. Such was the evident sincerity of the lumbermen in their willingness to submit to some form of government regulation that it elicited a statement from some of the Eastern members of the committee that it was a different attitude from what they had expected to find.

Discussion developed the fact that Idaho and Montana are today practicing forestry methods along lines approved by the government, and are actually co-operating with the government in the important matter of fire fighting. "It is not a theory, but an actual fact," said Mr. Huntington Taylor, "that we have demonstrated the practicability of co-operation with the government and of handling our forests in line with their regulations."

Like the Chicago and Minneapolis meetings, the Spokane discussion brought out the same situation regarding fire protection and taxation as being the chief obstacles to private practices of forestry.

"The farming element is suspicious of the lumberman," declared one speaker, "and have refused to make modifications in the tax laws which would make it possible for lumbermen to carry their cut-over lands."

"As the matter stands," he said, "the taxes are increasing instead of decreasing and the man who spends money to leave his lands in good condition for reproduction is confronted with a heavier tax than if he left them denuded. No one expects the lumberman to be a philanthropist, but that is the only way that he can practice forestry under the present system of taxation."

Fire protection was admitted by all to be the chief factor in growing new forests. Mr. T. T. Munger, of the United States Forest Service, Portland, stated that fire protection was 90 per cent of the reforestation problem in the Northwest.

"Burning of slash costs the forest service in the western yellow pine territory 35 cents to 45 cents per 1,000 feet," said Mr. Munger. "In some cases it costs only 5 to 8 cents."

C. L. Billings, Land Agent of the Rutledge Lumber Company and Assistant Secretary of the Coeur d'Alene Timber Protective Association, favored federal aid in fire protection; also a state law for Idaho, mentioning the fact that Oregon and Washington have state laws.

Regarding the possibility of fire insurance on timber, Mr. Laird stated that this subject had been considered, "but was too big a nut for us to crack," he said. "The rate would be so high as to be prohibitive."

Formulation of a state taxation system which does not compel the timber holder to cut his trees as rapidly as possible in order to safeguard his profit was advocated by Northwest lumbermen in the two-day conference at Seattle.

Leading lumbermen of Washington, which state annually cuts more timber than any other in the Union, scored the present taxation system as forcing lumbermen to sacrifice their holdings, and preventing reforestation and conservation. These burdens are not only true in Washington, but in other states with large timber resources, they asserted. They declared that private enterprise cannot afford to reforest and wait 50 to 60 years for returns under the present system, and that unless restrictive measures are removed the federal government and state must take up the burden.

The British Columbia yield tax system, which protects the holder of timber lands, was praised, and prevailing sentiment favored a similar measure in timber states of this country.

Testifying to the harmfulness of the present taxation laws, State Senator Alex Polson said that in his county, a typical example, the tax rate on timberlands has increased from seven to eight hundred per cent. This means that the taxes gradually confiscate the land. He favored the Canadian system of imposing a fixed charge, say \$125 a section, with the government receiving stumpage when the timber is cut. He said he believed private owners would take care of reforestation if they were financially able to do so.

Professors from the College of Forestry at the University of Washington, Seattle, asserted that with proper reforestation the Pacific Northwest could cut two and one-half times as much timber as last year without diminishing the supply. In other words, the country could draw on this section for approximately 25,000,000,000 board feet a year as a permanent output.

Reforestation and protection of green crops can be effectively carried out at a cost of about \$3 or \$4 an acre, annually, was the gist of testimony.

It was brought out that the stumbling block in the way of changing the present system is the making good of the immediate tax loss the state would suffer if the annual collection system were changed.

"Lumbermen should organize to exploit their interests," was the keynote of testimony from O. M. Butler, head of the federal forest products laboratory at Madison, Wisconsin. "The Federal Government is spending \$57,000,000 for research and education, but only one-half of one per cent is being used for lumber research."

That 1,500,000 additional acres of land would now be producing timber in Western Oregon and Washington had it not been for the ravages of forest fires, was among the statistics produced before the forestry conference at Portland.

George H. Cecil, United States District Forester, emphasized the menace of fires in their relation to the future

timber supply and supplied the figures as to the destruction to date.

"Besides killing outright all of the merchantable timber on millions of acres, fires have caused untold damage by killing trees here and there and injuring others, with the result of greatly depreciating the commercial value and the volume of the forests so fire-scourged," he said.

Reforestation in the wake of the logging operations and of the fires was taken up and dwelt upon in detail by the various witnesses and members of the committee. The planting of young trees at an average of 2,000,000 per year for the next 75 years was advocated by Dr. Hugh P. Baker, of New York, a member of the national committee, and secretary of the American Pulp and Paper Association. Dr. Baker produced figures to the effect that the normal timber consumption in the country amounts to a cut of 56,000,000,000 feet, to which he added firewood consumption of about 110,000,000 feet.

David L. Goodwillie, of Chicago, chairman of the committee, dwelt upon the necessity of federal and state cooperation in reforestation work.

"Fire protection and the losses here must be put fairly before Congress. When we can create the sentiment, the proper protection will come," he declared.

E. T. Allen, secretary of the Western Forestry and Conservation Association, discussed the relation of taxes to the diminishing timber supply.

"Mounting taxes make it impossible for the timber owner to hold his timber as a long-time investment," he argued. "The consequence is the cutting in excess of the demand with the resulting low prices during periods of light demand. Prices have become so low that the inferior logs and species are left in the woods."

Dr. Henry S. Drinker, of Merion, Pennsylvania, tax expert for the committee, urged the yield tax as the solution for the lumber producer. Discussion of this point brought out that opinion was inclined to believe that while the yield tax might place a heavy burden on the owners who have been paying taxes for many years, it was an improvement over the present situation. Robert E. Smith, Portland banker, urged that the yield tax would offer encouragement to the owners of cutover lands on which young trees were growing and who would not have to pay taxes until the timber was finally cut.

IN 1913 the United States imported into France common woods to the equivalent value of \$5,000,000 as estimated by the French Customs, and precious woods valued at \$720,000. The first three months of 1921, total value of common woods from United States was estimated by French Customs as \$500,000, at year's average rate of exchange. This is one-third of valuation of same period in 1920, which was much below pre-war trade.

WOODS imported into Belgium from the United States the first quarter of 1921 were valued at 2,839,638 francs.

FOREST EXPERIMENT STATION FOR THE SOUTH

BY E. H. FROTHINGHAM, ACTING DIRECTOR

APPALACHIAN FOREST EXPERIMENT STATION

[Read before the Southern Forestry Congress at Atlanta, July 22, 1921.]

LESS than six months ago the Appalachian Experiment Station, like its twin sister in the South, was in the category of things hoped for but not confidently expected. Today they are a fact. The "neatness and dispatch" which characterizes this achievement are apparent rather than real. There is a hidden background of hard and persistent effort by public-spirited and determined advocates to whom the friends of forestry in this region must ever be grateful; for the final establishment of these long-cherished stations must be highly gratifying to those who have at heart the broad economic development of the South, and particularly to those who know something of the difficulties with which the management of the forests has contended in the lack of precise knowledge of the requirements and response to treatment of the many different tree species and forest types.

No forest region in North America, it may be confidently stated, presents so great a variety of forest problems or, as a result of their solution, such large promise of real benefit in money returns, as the Southern Appalachian region. Its forests, in which northern and southern species mingle and in which many of the finest trees of the East are abundantly represented, are the most complex, botanically and silviculturally, in the United States. With a copious rainfall, moderate temperatures, long growing season, and deep soils, it is admirably fitted for tree growth. Its rugged topography and high relief result in a profusion of forest sites and types unequalled elsewhere in the East. Potentially this region is a vast self-replenishing storehouse capable, if properly handled, of yielding a perpetual supply of diverse forest products for consumption by the great population which surrounds it.

This is, briefly, the subject matter with which the Appalachian Experiment Station will have to deal. The station comes into the region at a time when the virgin forests that once covered it have been reduced by lumbering to a small fraction of their former extent. Recurrent fires have crippled much of the second-growth on logged-over lands, have reduced the reproductive vigor of the virgin forest, and have left some large areas in a badly depleted or wholly wrecked condition. The chestnut blight threatens the entire destruction of one of the most valuable and abundant species. It will be the function of the station to discover, by intensive study and experiment, the ways and means of restoring tone to the forest, of reclothing the coves, slopes, and ridges with the most valuable and rapid-growing species, and of striking the delicate balance between the various uses of the forest which will yield the highest aggregate benefit to the entire region.

This is obviously a set of ideals that cannot be attained in a short time or without large effort. The methods of scientific research will be used. Research supplants conjecture by fact. It does so by means of experiment, which may be called concentrated experience. The old negro who said that "good judgement am de results from experience, and experience am most generally always de results from po' judgement" did not have the experimental method in mind. We are going after a basis for "good judgement" in a different way. Forest research, in and out of experiment stations, has already advanced far enough to show how a great many of the problems in forestry may be attacked with good promise of success. Some of the methods of approach are round about and highly technical. Others are just ordinary common sense and close observation. We are fortunate in being able to begin our work by drawing upon an already existing experience in methods of forest research and the principles derived from them. With this as a starting point we hope to build up a knowledge of the forest requirements and the factors governing tree reproduction and growth in the Southern Appalachians that can be applied directly towards perpetuating the stands and improving them in quantity, quality and variety of wood products.

We are going to co-operate to the fullest extent possible with the private timber owners in the region. It happens, however, that this region contains large areas of national forest lands, which afford a splendid laboratory for field studies. It is too early in the history of the station to outline any definite program of investigations. This will involve a very thorough consideration of the needs of the region. So far as the national forests are concerned, these needs are already objects of administration, and can be stated under three general heads: (1) the development and upkeep of a continuous supply of lumber and other wood products, with reference also to their improvement in quality; (2) the restoration and maintenance of protection forests on the watersheds of streams rising in this region; (3) the development of incidental uses of the forests, such as grazing and recreation. It will fall to the experiment station to determine for different parts of the region and for different forest types how these results can best be accomplished. In general, therefore, the subjects we are going to study will probably be found mostly in the following classes: the characteristics and requirements of the different tree species, with a view to the encouragement of the better at the expense of the poorer; the classification of forest types and sites as a step toward the better management of each; the methods of cutting best adapted to securing the natural reproduction of desirable species; forest fires, introducing a wide range of questions in-

cluding their effects upon reproduction and young stands, and the use of controlled burning as a means of facilitating and protecting reproduction; methods of management which will produce forests offering the greatest protection to watersheds, the greatest regulation of stream flow, and the prevention of erosion; studies of the rate of growth of different species of trees under different conditions as a basis for determining the length of rotation and estimating the income from private or public forestry; tree measurements, to determine the volume in terms of various products; the development of methods of artificial reforestation, including both nursery practice and field planting; problems connected with the death of chestnut from the blight, and its replacement by other species; the proper place of grazing in the scheme of forest management; methods of brush disposal; and other subjects connected with the protection and rejuvenation of the forests and the increase of their value. In short, the problems ultimately to be covered are expected to develop the whole technical basis for the practice of forestry for the species, types and conditions of the region. The results obtained will apply not only to the administration of the national forests, but also to the handling of privately owned commercial tracts and even farm woodlots.

Manifestly this is a large order. With the small force of men and the scanty funds available a rigid selection of problems, in order of importance, must be made. Furthermore, not all the problems to be undertaken are susceptible of early solution. In many of them results can be obtained only after 5 or 10, perhaps more, years of periodic observation and measurement of sample plots. After all, however, these periods are not long, and the investments are small in comparison with the possibilities of increased productivity of the great areas which the experiment station will serve.

Just a word more about the station. Its technical force consists of three men in addition to the writer: Mr. E. F. McCarthy, Mr. C. F. Korstian, and Mr. F. W. Haasis. Our staff is quite cosmopolitan, combining training in forest investigations in Canada and New England, the Inland Empire, the Southwest, and the Southern Appalachian region itself. Its members bring a collective experience in practically all kinds of technical outdoor forestry, silvicultural and economic, theoretical and practical.

THE annual normal production of lumber in France is about 2,000,000,000 board feet, with nearly 4,700,000 cords of firewood. Total annual production of maritime pine in southwestern France is about 644,500,000 board feet according to a late report of the U. S. Consul at Bordeaux. Maritime pine is an important source of wealth to this district, next to vineyards and naval stores.

FURNITURE wood, to the value of \$402,963, was exported to Egypt from the United States in 1920, compared with \$178,875 in 1919 and \$267,244 in 1913.

A CONCERT ON HARNEY PEAK

DURING the past many unusual things have occurred on and near Harney Peak, highest point in the Black Hills of South Dakota; but it remained for a troop of

Boy Scouts of America to set the precedent of giving a band concert on this loftiest pinnacle between the Rockies and the Himalayas, on June 6.

The two to three thousand tourists who visit Harney Peak each summer usually feel that carrying their own weight up and down the three miles of mountain trail is effort enough, hence the Scouts in bringing their instruments, including bass drum and large horns over the trail, marks a



AMBITIOUS MUSICIANS

Proving their desire to rise in the world, this Boy Scout Band decided to give a concert on Harney Peak, 7,240 feet high—the highest point in the United States east of the Rockies.

decided innovation in Harney Peak history. The organization, which was made up of twenty members of Troop One, of Lemmon, South Dakota, made a tour of the Hills in charge of Scoutmaster E. Dickinson and Assistant Charles Olson, the musical programs being arranged by Bandmaster Dave Clark.

The itinerary of the trip, which was made in motor trucks, includes Newell, Belle Fourche, Spearfish, Deadwood, Lead, Sylvan Lake, Hot Springs, Wind Cave, Sturgis and other well-known points of the Hills. An added feature of the concert on Harney Peak was that it was enjoyed also by guests at Sylvan Lake and the Forest Service officers at Custer, who listened in by telephone.

FRANCE it is estimated, lost 10 per cent of its lumber and 6½ per cent of its firewood in the World War. Before the war the forest area of France was 24,430,000 acres or about 18.7 per cent of the total land area. Of this 29 per cent was in oak and 19 per cent in beech.

The Service of Forests of the French Department of Agriculture estimated early in 1919 a loss of nearly 1,500,000 acres of wooded area due to the war, and the destruction of more than two billion board feet of lumber.

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RESOLUTIONS FOR THE SNELL BILL

THE Utah Academy of Sciences in resolutions states: "It is recognized that the timber supply of the nation is rapidly becoming depleted;

"The forest resources are of the greatest importance in the economic and industrial development of Utah and of the entire nation;

"The maintenance of proper forest conditions on important watersheds is conducive to a regular and continued stream flow and an adequate supply of pure water so essential for domestic, hydro-electric

and irrigation use;

"Be it resolved, That the Utah Academy of Sciences strongly endorses the conservation of forests to the extent of maintaining all potential forest land in a highly productive condition. With this purpose in view, we, therefore, strongly urge the adoption of a national forest policy for the entire nation similar to that proposed in H. R. 15,327, introduced in the third session of the 66th Congress, commonly known as the 'Snell Bill.'"

CARELESS TOURISTS START DESTRUCTIVE FOREST FIRES

Because of the war, Germany lost about 21,547,520 acres of land exclusive of plebiscites. This was undoubtedly a serious national misfortune to Germany. The United States, during the period 1916-1920, inclusive, burned up 56,488,307 acres of our forested area—over 2½ times as much as Germany's entire loss—an area greater than New York and Pennsylvania combined, or of Minnesota, Kansas, Idaho, or Utah.

While it is impossible to trace the origin of all forest fires, the records of the Forest Service of the United States Department of Agriculture show that a large number originate through the carelessness of happy-go-lucky tourists. The Forest Service is anxious to encourage the use of the National Forests as recreation grounds. It cooperates with plans for building fine roads through the forests, and establishes numerous free camping grounds, where shelter, water, and firewood may be obtained. Many of these camps are located on main automobile highways and are easily reached. Some States provide tourist guide maps to the forests and camp sites. About 5,000,000 people, it is estimated, use the forests each year during the vacation season. At Eagle Camp Ground on the Columbia River Highway in the Oregon National Forest, 132,000 tourists registered last year.

Some of the campers, however, do not seem to appreciate the pleasures and privileges afforded to the touring public. They disfigure the scenery with rubbish and filth, they disregard game laws and pollute streams, but their worst and most frequently recurring offense, according to forest officers, is the starting of destructive fires by carelessness either with camp fires or with smoking.

A lighted cigarette thrown into dry leaves or needles, may start a fire that will spread for miles. A camp fire not fully extinguished may be the means of destroying valuable timber which has taken hundreds of years to reach maturity. The reports of forest rangers are filled with dramatic accounts of the work involved in controlling such fires, and also in detecting and bringing the culprits before a judge after following the very slight clues obtainable in a deserted camp site. Sometimes an old bottle or a pocket handkerchief will reveal the original possessor who did not put out his fire. Sometimes a particular make of automobile tire can be traced for miles and the careless camper brought to justice.

No fines, however, on the part of the local magistrate, will restore the burned area. While forest rangers are vigilant and alert to catch carelessness and prevent incipient fires, the real need, the foresters say, is for the development of more conscience on the part of the public which uses the National Forests. It is greatly desired by the Forest Service that all the 147 National Forests, from the Atlantic to the Pacific, and from

Gulf to Border, be used and enjoyed to the fullest extent by as many people as possible. This involves universal adoption of the slogan, "Be sure your fire is out!"

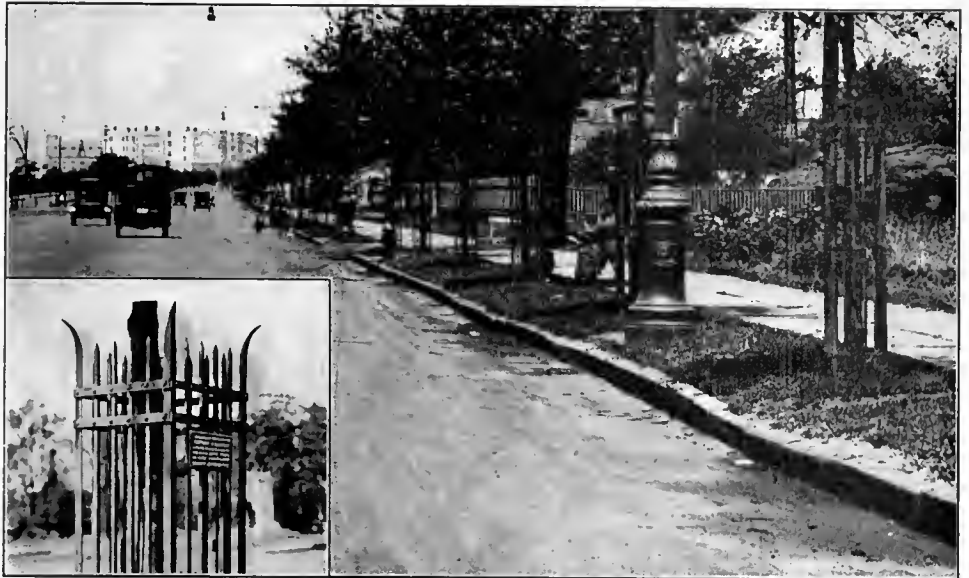
LUMBER DATA FOR DEPARTMENT OF COMMERCE

Mr. Franklin H. Smith, Assistant Secretary of the National Lumber Manufacturers Association, has been working with Dr. F. M. Surface of the Department of Commerce in gathering basic data relative to the lumber industry for use in the Department's monthly publication "Survey of Current Business."

The "Survey of Current Business" is a summarization of relative figures dealing with the movement of products in many lines of business. The publication gives expression to the views of Secretary Hoover for the necessity for a correlation by the government of statistics compiled by many sources on the production, consumption, shipment, stocks, importation and exportation of raw materials and finished products.

TROOPS TO FIGHT FIRES

Adjutant General Beary and Chief Forester Pinchot of Pennsylvania have agreed upon a plan to use the State's cavalry troops, located in the mountainous sections of the State, to combat forest fires. The mounted troopers, it is believed, will be especially valuable in rounding-up fire fighters when they are needed to check the spread



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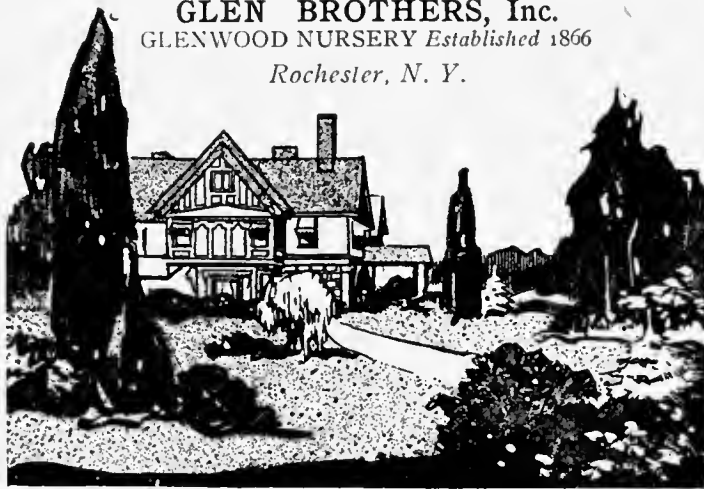
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PENNSYLVANIA'S FORESTS

FIGURES compiled by the Pennsylvania Department of Forestry indicate that the commonwealth has made a net gain of more than \$4,750,000 on its investment in state forests. The statement shows the total purchase price of the 1,125,611 acres now handled by the Department of Forestry was \$2,545,134.65.

Since 1898, when the Department of Forestry began purchasing forest land, there has been expended for administration, development and improvement \$4,702,155.96, making the total investment and expenditures \$7,247,290.61.

It is estimated that the state forests are now worth about twelve million dollars, consequently, the net gain has been \$4,752,709.39. Commenting on this profit, Chief Forester Pinchot said it shows conclusively that the state's forest holdings are an investment and not an expense to the commonwealth.

The financial statement showed further that the Department of Forestry has paid for road, school and county taxes \$616,040.17 to the counties in which the state forests are located.

NEW YORK STATE COLLEGE OF FORESTRY

Prof. R. R. Fenska has resigned as assistant professor in forestry at the University of Montana to become professor of forest engineering at the New York State College of Forestry, Syracuse university.

Professor Fenska is well equipped for his profession, having spent his early years in the pine forests of Wisconsin, where his father was a pioneer lumberman. He was graduated from Beloit in 1911 and from the Yale forestry school in 1913.

He served two years as forester's assistant on the Wisconsin state board of forestry and instructor of forestry at the University of Wisconsin where he carried on work at the United States forest products laboratory.

FINLAND'S FORESTS

Finland, with the largest percentage of forest area of any country of Europe is in a position to export about two billion feet of lumber annually, estimates Trade Commissioner Axel H. Oxholm of the Department of Commerce in a special report on the forest resources, lumber industry and lumber export trade of that country, just published by the Bureau of Foreign and Domestic Commerce for the information

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of flames. The plan was suggested to Forester Pinchot by District Forester R. B. Winter, of Mifflinburg, who worked it out successfully with Captain Donald Zimmerman, commanding officer of Troop M, of Lewisburg. Volunteers for the forest fire service will be recruited in each cavalry troop in the interior of the State. Because of their favorable locations, troops in the following places will be asked to cooperate: Bellefonte, Lock Haven, Boalsburg, Harrisburg, Tyrone, Carlisle, Punxsutawney, Altoona, and Chambersburg.

TREE PLANTING IN VARIOUS STATES

In New York State over 60,000 acres are reported by State Forestry officials to have been planted with trees, mostly pines, since 1901.

Thousands of Scotch and white pine trees have been planted in various sections of Massachusetts this season.

Louisiana has called upon her boys to help replant her forest land and an annual prize of \$500 is offered by a big lumber

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of American lumbermen and exporters.

Seventy-five per cent of the forests of Finland are pine and spruce, and about 25 per cent broad-leaved species. Exports before the war were confined mostly to European countries. Now, however, Finnish exporters are making energetic efforts to widen the scope of their activities, the Trade Commissioner tells American lumbermen who may feel the force of this greater competition in their foreign markets.

The report covers Finland's forest resources, lumber industry and lumber export trade in exhaustive fashion. It discusses the forests, lumber manufacture, cost of production, export trade, prices, character of timber, markets, shipping and similar subjects in detail. It is known as Special Agents Series No. 207: "Forest Resources, Lumber Industry and Lumber Export Trade of Finland." Its price is 30 cents a copy, and it can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., and from the district and cooperative offices of the Bureau of Foreign and Domestic Commerce.

CALIFORNIA SERVICE MEN GIVE UP SMOKING

Realizing the danger of forest fires from burning tobacco even when used in the woods by the most careful persons, District Forester Paul G. Redington has called upon the field men of the National Forests of the California District to refrain voluntarily from smoking during the next few months of extreme fire danger.

"The forest ranger recognizes," the District Forester said, "that smoking accidents will happen and that even the most careful man has lapses." Further, it is, of course, the duty of every forest officer to do everything within his power by example, education, and otherwise to eliminate the serious hazard which results from careless smokers in the forests.

"A large body of forest officers will undoubtedly go without their smokes this summer for the good of the cause and this fact should be an important factor in driving home the idea of care with fire, both to the general public and to the thousands of people who come in contact with the rangers on the job," said Mr. Redington.

"I am asking every one of the more than 500 field men in this District who is a smoker if he desires to place himself on record as agreeing to refrain from smoking in the woods during the dangerous fire season, except when in camp or at regular places of habitation, and I believe that I know our forest officers well enough to say that the large majority will be glad to deprive themselves of a friendly pipe or cigarette as they go about their work this summer if they can help the cause of forest fire prevention by so doing," the District Forester remarked.

At present the fire situation is very-critical.

Precipitation has been very low, this year, with the prevalence of hot, dry winds and the opening of the deer hunting season within the next few days in several of the coast counties, increases the fire hazard considerably. However, the forest officers are hoping that the great number of users of the National Forests will be more careful this year than ever before, and that the percentage of man-caused fires may be greatly reduced from the high figure that it has held for the past several years.

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CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PAST PRESIDENT CANADIAN SOCIETY OF FOREST ENGINEERS

Quebec has experienced the driest spring and early summer for many years. For over six weeks scarcely a drop of rain fell and the woods became so dry that on rocky slopes, where the soil was thin, the trees died entirely. The soil in the forests was like so much tinder and any fires which started sprang up again and again after they were extinguished and even after heavy rains had fallen. The fire would get into rotten logs or duff and creep along underground for unbelievable distances and reappear again after everyone thought the danger was over. Owing to a large number of men being without regular employment, many persons were fishing in the woods and to them the greatest number of fires was directly attributable. The railroads showed a very great improvement in the matter of setting fires, notably the lines under the control of the Canadian National Railway, which has been the worst offender in the past. The number of fires set by farmers was greater than ever owing to carelessness in enforcing the permit law and in the issuing of permits, but the damage was mostly confined to their own woodlots.

The employes of lumber and paper companies working on drives and so forth, showed a marked improvement. Many fires were set by people driving along country roads and throwing matches and lighted cigarettes into the bushes. When the character of the weather is taken into consideration the total losses are surprisingly small and this is due in great measure to the fire fighting activities of the cooperative protective associations. The cost of fighting fires will run to a very large amount.

There are two very striking lessons to be learned from the spring season. The first is that measures which are entirely adequate in ordinary seasons break down in exceptional ones. The second is that the old method of patrol by men in canoes is practically useless. Travelling as they do in the river valleys, they cannot see smoke until a fire has assumed large proportions and the only way forest fires can be controlled is by putting them out almost immediately. In spite of the cost lookout towers connected by telephones must be installed or better still an aerial patrol must be installed. It is absolutely impossible for the man in charge of fire protection over an area of, say 15,000 square miles to handle it intelligently and properly by travelling around by buggy and canoe. He should be at all times in personal touch with the situation and should not be dependent on the reports of others. When it takes two or three days of fatiguing travel to get from one part of his district to another when he might do the same thing in an hour and a half, he is wasting time and energy. During a dangerous season reports are coming in all the time of new fires and many of these are false or exaggerated. They worry and annoy a man exceedingly and often lead him or his men on wild goose chases. If he travelled by air he could at all times make the circuit of his district and see every fire in one day and get back to headquarters the next night. Being able to see just what was going on he could lay out and direct his work much more efficiently and intelligently and save much worry and exertion. Having all his inspectors and rangers absolutely under his eye they would be much more efficient and also people would be more careful about setting fires. In a patrol carried out by the Laurentide Company this spring a daily report was received of all the fires in a territory of ten thousand square miles. The report covered fires previously burning, with sketches and photographs showing the areas burnt to date, new fires, giving lo-

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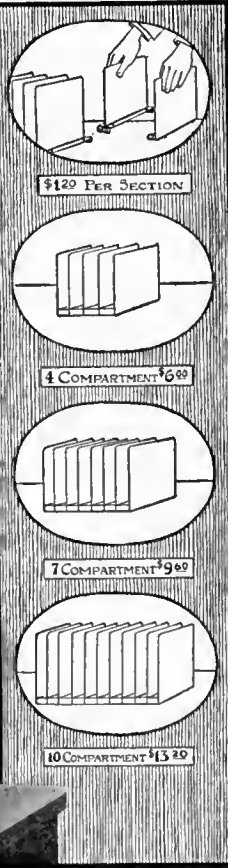
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cations exactly even to the number and range of the lot, and whether they were being attended to or not. With a plane fires can be reported when the first wisp of smoke rises and it is perfectly possible for a plane to land a man or men at a lake near a fire to put it out and then go back and report and if necessary bring men and a gasoline pump to the fire. With pigeons or wireless the report would be even quicker. A report by plane would at the most mean only one and a quarter hours flying. It is too bad that the protective associations will not employ planes. The cost of fire fighting alone this season would have installed many planes and the men necessary to operate them and the timber lost would have paid for such service for many years.

The fire situation in British Columbia and the Prairie Provinces seems not to have been bad this year as few reports of fire have come in. In Ontario the Fire Protection system instituted a few years ago seems to be working much better than last year. Some complaints have been made but the efficiency seems to be increasing. In Nova Scotia the season has been a very bad one. This Province has been urged for a long time to appoint a forester and to organize a proper protective system but nothing has been done with the result that much damage has been caused this year. In New Brunswick there is an efficient fire protection service, but this seems to have broken down on account of exceptional weather conditions and much damage has been caused both in the forest and by the burning of settlements and summer resorts.

Much of the damage caused this year has been due to fishermen. Many of these seem to be men who were out of work and having nothing else to do went fishing. There seems to be only one answer to a problem of this kind and that is to compel every man who goes into the woods for any purpose to first obtain a permit from the local fire-ranger. This would cost no money and would work no hardship and it would at the same time make people more careful as there would be absolute proof that they were in a certain locality and if a fire started there they would be charged with setting it. The Quebec Government was urged by the lumbermen two years in succession to pass such a law but they refused on the ground of the possible political consequences. The holders of licenses to cut crown timber were told that they had all the rights of tenants and could forbid anyone to enter on lands under lease or make the taking out of a permit a requisite. Of course the individual lumbermen and even the protective associations hesitate to take such a step as disgruntled individuals might set incendiary fires. If it were the law no one would think anything of it and the associations could see that it was enforced. Strong pressure

will be brought on the Government this coming session of the legislature to enact such a law and it is hoped that it will be successful.

Mr. G. C. Piche, Chief Forester of Quebec and Mr. Edward Beck of the Canadian Pulp and Paper Association have just returned from a trip to Scandinavia, France and England, where they have been looking over forests and into forestry conditions. Mr. Beck has written a very interesting series of articles for the Canadian papers, which have been widely published and which have been read with great interest.

There are rumors of a reorganization of the Forestry Department in Ontario. This is badly needed and it is to be hoped that men will be chosen who have not only technical but business ability and who will be free from political strings. This great Province has great natural wealth and the conduct of its forest policy leaves a great deal to be desired. There is needed a Department of Forestry free in all its branches from political patronage, with a continuous and consistent policy. There is great need to revise the method of timber sales and the collection of dues on timber cut on Crown Lands. A Commission is now investigating this and much carelessness has come to light which must have meant a large loss to the Province in revenue. Scaling regulations need to be changed and the scalers to be freed from dependence on the lumbermen. The fire protective system needs to be much improved and the most excellent ideas of the Premier on reforestation should be put into operation without delay.

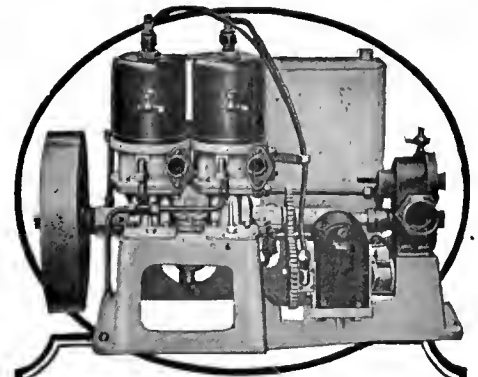
Almost all the wood-using industries are overstocked with wood and there will be very little cutting of timber this winter. Many men who earn their living in the woods will be without work this winter and there will be a very considerable falling off in revenue to the Provincial Governments.

FORBES HEADS SOUTH'S NEW FOREST STATION.

R. D. Forbes, Louisiana State Forester for several years, will serve as director of the southern forest research and experiment station of the Forest Service. Congress provided an appropriation which became available July 1, and the selection of Mr. Forbes is recognition of his standing as a successful and thoroughly competent forester, and of his administrative ability.

For the present the headquarters of the new station will be in New Orleans. He will begin his new duties at once, with a staff of three trained technical experts assigned from the Washington offices.

It is believed that V. H. Sonderegger, who has been Mr. Forbes' assistant in the State forestry work, will succeed him as State forester of Louisiana.



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DOMESTIC EXPORT

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TO STOP FOREST FIRES

NEW YORK STATE'S forest fire protection service will be enlarged and strengthened by an increase in the funds allotted to the state by the federal government. New fire-fighting apparatus of the latest and most effective type will be purchased and additional fire districts will be organized, covering forested portions of the state that heretofore have not been included in the fire towns. Conservation Commissioner Ellis J. Staley has received from the United States Forest Service notice of its approval of the plan of co-operation between the state and federal authorities, under which the national government adds \$22,050 to the money appropriated by the state for fire protection work. Under the new plan of co-operation, which was worked out at a conference between Clifford R. Pettis, Superintendent of State Forests, and Louis S. Murphy, acting Chief of the Eastern Division of the Forest Service, the federal government will purchase four forest fire pumps and turn them over to the Conservation Commission and provide for the establishment of new fire districts in the eastern, southern and southwestern portions of the state.

**"Take No Chances
With Camp Fires
Put Them Out."**

FIRESETTER CAUGHT BY AID OF TELESCOPE

In July, 1921, Alonzo E. Dole, a professional land locator operating in the Siuslaw country for years was convicted in the United States District Court at Portland, Oregon, on the charge of wilfully setting forest fires on the Siuslaw National Forest. He was sentenced to four months in the Multnomah County jail, and his application for a new trial was denied.

Dole had long been suspected by officers of the Forest Service of the United States Department of Agriculture of wilfully setting fires on the Siuslaw National Forest, but owing to the sparse settlement of the great forest area and consequent lack of witnesses, and the further fact that by long practice he had mastered the trick of flipping a burning match in the brush along a road or trail, even on horseback, efforts to obtain evidence against him were long unsuccessful.

The circumstances in connection with Dole's arrest and conviction were somewhat unusual. As shown by the evidence, one of the witnesses was trying out a new telescope by watching occasional passers-by on a road a few hundred yards away. While doing, he saw Dole, who was riding by on horseback, strike matches and flip them, while burning, into the dry ferns and brush along the roadside, thus starting fires.

VOLUNTARY AIR FIRE-PATROL WORK

An airplane patrol in the Pikes Peak region is being carried on without cost to the Forest Service of the United States Department of Agriculture, says the *Weekly Bulletin*. A Colorado aircraft company has an agreement which calls for constant lookout for fires during regular trips, and special trips to locate smoke are being made at the request of the Forest Service. The pilots, who are appointed special unpaid fire guards, are provided with maps and telephone directories of forest officers, and the airplanes bear on their wings, in neat letters, "Official Forest Service Patrol."

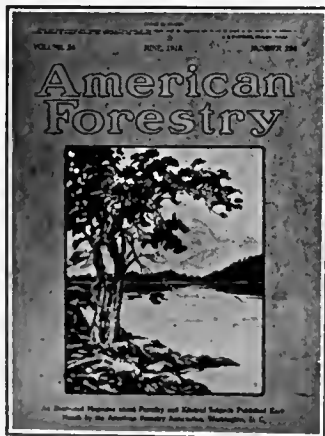
This patrol may cost the aircraft company a good deal, if many special flights are necessary. The company, however, does not expect to charge the expense to philanthropy; it believes that it can render this public service gratuitously and at the same time its planes will be known as the ones which do this special fire patrol work. There is no Army air field anywhere near this district with which the Forest Service can cooperate, as on the Pacific coast, for forest fire patrol, so it is of great advantage to the service to have this patrolling done voluntarily.

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BOOK REVIEWS

A Short Manual of Forest Management—
By H. Jackson. Macmillan (New York).

In his preface the author states that the object of the book is to present a brief and simplified text-book on forest management, based on a practical foundation, and he has eminently succeeded. The subject is, of course, thoroughly covered by standard works familiarly known, but these are expositions of the highest theory and somewhat formidable for the ordinary student or for the public—this little manual is the bridge between. Undoubtedly it will be well received and serve a most useful purpose.

The Red, White and Blue Manual. Johns Hopkins Press, 1921.

Volume I, Red Course. A textbook for the citizens' military training camp. By P. S. Bond, lieutenant colonel, Corps of Engineers, U. S. A.; O. O. Ellis, late lieutenant colonel, A. E. F.; E. B. Garey, major, infantry, U. S. A.; T. L. McMurry, captain, infantry, U. S. A.

This volume is the first of a series of three manuals, especially prepared to meet the needs of students at military training camps. The "Plattsburg Camps", which became famous under the leadership of General Leonard E. Wood before our entry into the World War, inaugurated the system of volunteer military training camps for citizens, and the Citizens Military Training Camps, now conducted by the War Department, are the logical outgrowth of the Plattsburg idea. The training given will be thorough and systematic and as the need was felt for a series of manuals for the students, a revised and greatly improved "Plattsburg Manual" is here offered for the "Red" or first-year camps.

The Ranger. Published as a monthly by the Filipino Ranger's Association.

This interesting paper is devoted to the interests of forestry, lumbering and the conservation of natural resources in the Islands. It declares editorially that "the conservation of our natural resources is the greatest internal problem before the country today, and forestry touches the conservation of all our natural resources," and goes on to say that "passage of wise legislation and liberal appropriations for the development and utilization of our natural resources constitute the chief hopes of the Filipino people."

These statements indicate clearly that the necessity for economic development in the ultimate achievement of independence is fully realized by leaders of thought in the Islands and are a good indication that the necessary reforms are under way through the practical application of educational propaganda. The development of forestry and proper conservation in the Islands is going bravely forward and this paper is welcomed as the spokesman of the Ranger Association.

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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EX-SERVICE MAN wishes employment with some Forest Construction Concern or Irrigation Company which can use a young man who is a Technical High School Graduate, and who is a Mechanical Draftsman with some slight knowledge of plane surveying. Willing to work and can do same. Address Box 2095, AMERICAN FORESTRY MAGAZINE, Washington, D. C. (6-8-21)

CAN YOU USE ABILITY?—Young man, technically trained with master's degree in forestry desires position of responsibility with some lumber or forest products company. Fifteen months experience. Address Box 212, Lockhart, Alabama. (8-10-21).

POSITION WANTED as City Forester or Park Superintendent. Have had practical experience as Manager of Private Estates and have been 14 years in present position as Park Superintendent. Desirous of making a change at this time. Address Box 3005, care of AMERICAN FORESTRY, Washington, D. C. (9-11-21)

TREE SURGEON—Formerly employed by the Davey Tree Expert Company, desires to make connection with some reliable company doing work such as tree surgery, or private work on large estate. Will consider reasonable salary to start if good future offers. Address Box 3010, care AMERICAN FORESTRY, Washington, D. C. (9-11-21)

MARRIED MAN would like position as CITY FORESTER or in charge of large private estate. Any forestry position will be considered as a change in locality is desired. Have had technical training and recently graduated from one of the foremost forestry schools of the country. Ex-service man, having spent three years in the service. Address Box 3020, care AMERICAN FORESTRY Magazine, Washington, D. C. (9-11-21)

CITY LANDSCAPE ARCHITECT AND FORESTER, thoroughly conversant with Southern conditions, desires to change. Correspondence invited. Address D, care AMERICAN FORESTRY Magazine, Washington, D. C. (9-11-21)

POSITION OPEN.

POSITION of Secretary-Treasurer of Forest Protective Association of Timberland Owners open. Duties will be to conduct correspondence, keep accounts, canvass for new members, work out publicity campaigns, etc. Applicants should state salary desired. Address Box 550, in care AMERICAN FORESTRY, Washington, D. C.

KILN DRYING COURSES AT MADISON

Ignorance of the nature of kiln drying defects and of the effects produced by them in subsequent manufacturing operations is responsible for a great deal of loss in lumber-producing and wood-using industries. Many plants are consistently taking losses which they could easily avoid if they only knew that these losses were unnecessary.

This fact has been brought out most forcibly at every one of the seventeen short courses in kiln drying which have been given by the Forest Products Laboratory. The students frequently don't understand the extent of their difficulties until they have learned what results can be secured by really good practice.

There is great need for general education upon this subject. The laboratory makes every effort to carry on this educational work by means of advice given through correspondence, consultation at the laboratory, lectures, and publications. Several thousand plants throughout the country avail themselves of this service every year. Once they understand what can be accomplished by up-to-date equipment and methods, the securing of the necessary detailed knowledge is an easy step.

It is to assist the manufacturer in taking this step that the short courses in kiln drying are conducted. They are especially adapted to the requirements of practical men and the lectures are given in simple language which anyone can understand. Experience has shown that the amount of good each student secures from the course depends wholly upon his own capabilities.

The dates for the next four courses are August 15-16, September 12-23, October 10-21, and November 7-18. Enrollments for any of these courses may be made now. The cooperative tuition fee of \$150, which is less than the actual cost of instruction, may be paid at any time during the course. Address Rolf Thelen, in charge section of Timber Physics, Forest Products Laboratory, Madison, Wisconsin.

Edward F. McCarthy, first forester in the faculty of the New York College of Forestry at Syracuse, has been given an important new position in the United States Forest Service, being assigned to the new forest experiment station being established at Asheville, North Carolina. He will rank next to the director of the station, one of the old forest service officials, and the taking of a man from outside the service for so important a position is somewhat unusual.

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AMERICAN FORESTRY

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WASHINGTON, D. C.

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CHANGE OF ADDRESS

A request for change of address must reach us at least thirty days before the date of the issue with which it is to take effect.
Be sure to give your old address as well as the new one.

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PROPOSED CHANGE IN THE BY-LAWS

In view of the fact that the by-laws of the American Forestry Association, as amended last February provide for seven permanent directors for the purpose of assuring proper control and direction of the Association's endowment funds and other property, and that this is believed by some members of the Association as not being the most democratic and serviceable form of management, the action outlined in the following report has been taken by the Board of Directors:—

On Thursday, August 25th, Col. W. B. Greeley, Col. H. S. Graves, Mr. F. W. Besley, Dr. H. S. Drinker, Mr. Chester W. Lyman, and Mr. Nelson C. Brown met by appointment at the University Club, in Washington, as tions recently agitated and discussed in regard to the By-Laws of the American Forestry Association. After a full discussion of the whole situation, they reached the following conclusions, which were laid before the Directors of the Association at a meeting held Tuesday, August 30th:

"(1) The provision for 7 permanent Directors was agreed to be eliminated. As to this, Col. Greeley suggested that a system somewhat similar to that which formerly prevailed in the Association could be adopted, leaving the choice and election of all the Directors wholly in the hands of the members of the Association. He suggested the substitution of an elective Board of 15 members, 3 to be elected annually by ballot by the members of the Association, to hold office for 5 years. The Committee unanimously approved this suggestion.

"It was further suggested that in place of the appointment of a number of permanent Directors, a plan of having a Committee of three permanent Trustees to hold the Association's endowment funds and life membership payments be considered by the Board.

COL. HENRY S. GRAVES' LETTER TO FORESTERS

Col. Henry S. Graves whose petition to the Board of Directors of the American Forestry Association in regard to the changes in the by-laws of the Association referred to above was signed by a number of foresters, has sent the following letter to these foresters:

"At a recent meeting of the Directors of the American Forestry Association, a resolution was passed requesting Col. Greeley to name a committee of three foresters to confer with a committee of the Directors, with reference to the matters contained in the petition which was signed by you in the Spring.

"Col. Greeley, Mr. Besley, and I, acting in the informal capacity of advisers, met with Dr. Drinker, Mr. Lyman and Mr. Brown on August 25th. The representatives of the Directors received our suggestions regarding the by-laws very cordially and were glad to join in specific recommendations to the Board in regard to them. They were also as one with us in the suggestions about the aims of the Association and the means to forward the

"(2) All non-salaried officers (at present, the President, Vice-Presidents, and Treasurer) to be elected annually by letter ballot by the members of the Association instead of by the Directors. Nominations for Directors and for the non-salaried officers to be made annually by a nominating Committee of representative character appointed by the Directors, any group or groups of 25 members also to have the right to nominate tickets, to be sent out to the members by the Secretary with the ticket suggested by the nominating Committee.

"(3) The power of the Directors to amend the By-Laws to be eliminated. All amendments to be made by the members of the Association.

"(4) The plan of the Directors that has been under consideration, to appoint a competent, trained and experienced Forester as a member of the working and editorial staff, under the direction of the Directors, to assist in taking the leadership in promoting forestry in the nation,—was heartily endorsed and strongly recommended.

"It is the policy of the Directors to employ a Forester for this purpose as a permanent feature of the work of the Association as soon as that can be brought about, and to place him in a responsible relationship toward the editorial policy of the magazine on forestry matters."

(Signed) W. B. GREELEY,
H. S. GRAVES,
F. W. BESLEY,
H. S. DRINKER,
CHESTER W. LYMAN,
NELSON C. BROWN,

The Board of Directors of the American Forestry Association at their meeting held August 30, 1921, unanimously approved the above recommendations.

interests of forestry through the Association, especially in the appointment of a forester who would be responsible for the editorial policy of the magazine in forestry matters and for handling other forest activities of the Association.

"The recommendations of the committee are contained in the enclosed statement. These have already been approved by the Board which will take appropriate steps looking to their adoption at the annual meeting, or sooner, if practicable.

"The points raised in the petition submitted by us on May 20th, have now been met by the Directors. This action of the Board should receive the appreciation of those who have objected to the changes in the by-laws, and I hope that they will stand ready, as I shall do, to assist in carrying out the new plans and otherwise forwarding the interests of the Association."

Very sincerely yours,
HENRY S. GRAVES.

AMERICAN FORESTRY

VOL. 27

OCTOBER, 1921

NO. 334

FIGURE IN WOOD

BY SAMUEL J. RECORD

PROFESSOR OF FOREST PRODUCTS, YALE UNIVERSITY

WOOD is one of the most variable materials in the world. In density it ranges from a pith-like substance used for pith-helmets and life preservers to lignum-vitae and ironwood which, even when perfectly dry, are a third again heavier than water.

In color there is the chalky white of holly at one extreme and the jet black of ebony at the other. There are to be found almost every possible shade and combination of red, orange, yellow, green, blue and violet. With the woods of the world at one's disposal it would be a simple enough task to arrange the hues into a perfect rainbow.

In figure there is an equally wide range from the plain and drab to the highly ornate and fantastic. The cabinet maker, the furniture manufacturer and the architect have a choice of material with which to satisfy every task and whim of the trade. With judicious use of stains and bleaches, fillers and varnish the decorative effects with wood are unlimited. Figure in wood

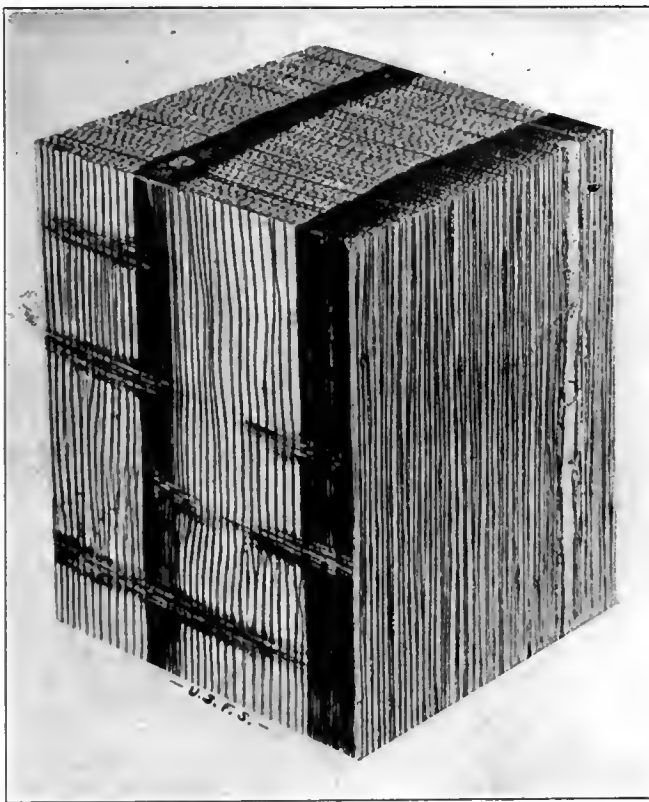
has various sources. These may be grouped in those due to structure, those caused by color variation or pigmentation, and to combination of the two. These again may be classified as normal and abnormal or pathologic.

By normal is meant the natural condition of the wood of a sound tree. In the abnormal or pathologic are to be found the peculiar distortions and colorations resulting from disease, the attacks of insects and the activities of various agencies not a part of the regular life processes of the trees. First among the normal comes the figure resulting from the layers of growth which reflect the seasonal variations.

While all trees of the Temperate Region and many of those from the Tropics have growth rings, in not all cases, by any means, are the contrasts in density and color great enough to show prominently in the finished material. Common examples are basswood, aspen, paper birch, tulip wood, holly, tupelo, buckeye, yellow cedars, and certain of the pines, firs and spruces.

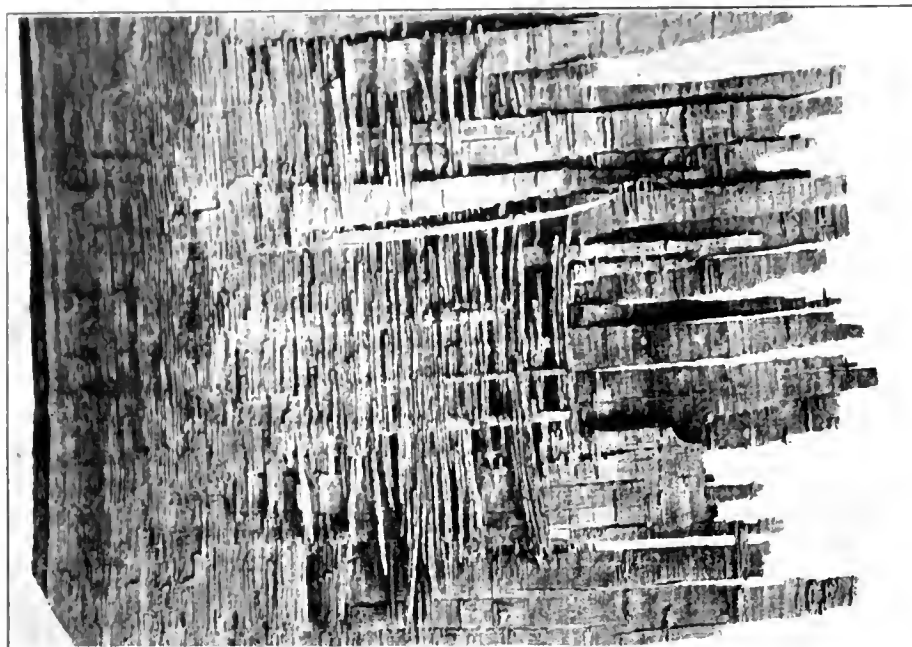
On the other hand, there are certain conifers and hardwoods with a distinct layered or banded structure. In such cases the wood envelope laid on in early spring is softer, of looser texture and normally lighter colored

than that produced later in the growing season. If a log were a perfect cylinder and the layers regular throughout, the ends would show a series of concentric circles, alternating light and



A BLOCK OF PINE MAGNIFIED TO SHOW LAYER GROWTH

Showing alternating light and dark bands which produce the figure in finished lumber. The face to the left is radially cut or "quarter-sawn"; that to the right, tangentially cut or "flat-sawn".



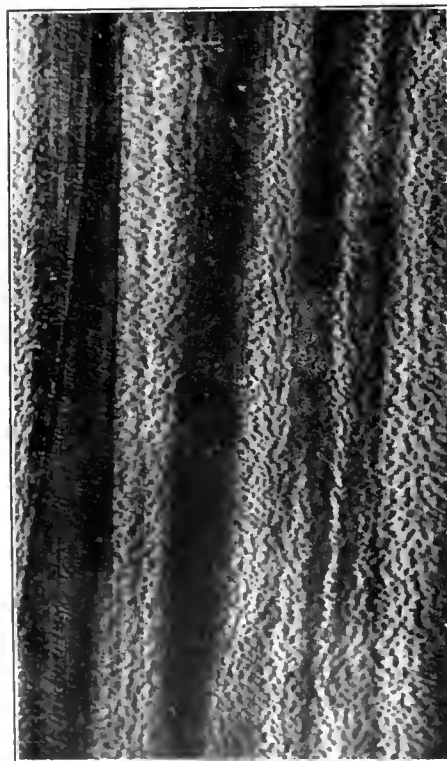
A PIECE OF QUARTERED WHITE OAK BOARD
Most of the fiber is rotted away, leaving the thin ribbons, known as medullary rays.

dark, while a split surface would be marked with parallel stripes. If the split ran straight through the middle these parallel stripes would be of uniform width; if the split were tangential or slabbed off at right angles to a radius,

there would be a wide band in the middle with narrowing stripes at either side.

But logs are not perfectly round; they are more or less flattened and tapered; the growth rings are not perfectly regular, but vary in thickness and may be undulating or decidedly wavy, while branches and small limbs cause local deformations. In consequence, when a board is sawed these various irregularities show up in the grain. Boards cut tangentially or flat sawn will have the most conspicuous figure, while those from the middle, or radially sawn, may show nothing but light and narrow stripes, the edges of the seasonal growths.

To these two general methods of cutting a board from a log, the



ROE OR RIBBON GRAIN IN SYCAMORE

The striping is due to differences in direction of fiber layers, the finer markings to the rays.



UNUSUAL MOTTLE IN POPLAR
Yellow poplar board showing peculiar mottle resulting from disturbance of the cambium layer by woodpeckers.



EFFECT OF A BRANCH ON THE GRAIN OF PINE

It is from the crotches of mahogany trees that some of the finest figured material is obtained.

trade has given the names quarter-sawn, that radially cut, and flat-sawn, that is, tangentially cut. The name, quarter-sawing, comes from the mill practice of dividing large logs into quarters and then cutting boards

from these so as to get the faces radial or nearly so. Unless the boards are V-shaped or tapering, as in the case of clapboards, it is obvious that only a few will face in a true radial plane.

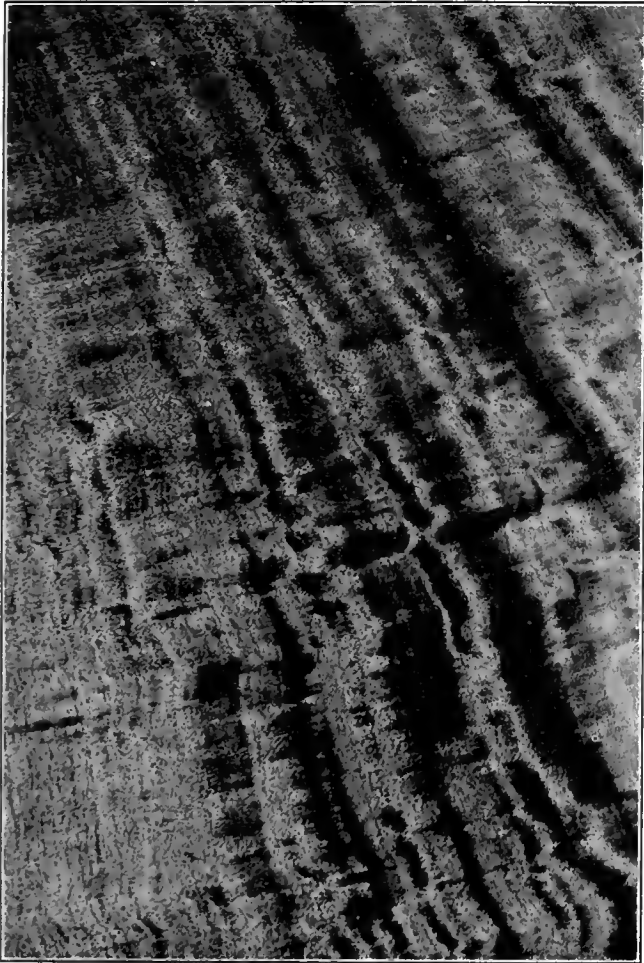
In the case of the hard pines and Douglas fir, quarter-sawn or edge-grain lumber is preferred for flooring because it will wear uniformly and not sliver, but for interior finish, door panels and similar uses where figure is wanted, the flat-sawn or slash grain, as it is often called, is preferred. Douglas fir usually produces a more strik-

short, depending on the angle at which they were cut through.

In some woods, notably the oaks, another kind of figure is produced by quarter-sawing. In practically all woods there are ribbons of tissue which run at right angles to the axis of the tree like spokes in a wheel. These are the rays, often called medullary or pith rays because some of them appear as extensions of the pith into the wood. In all the conifers and most hardwoods these rays are too fine to show distinctly. In others, as in maple, cherry and mahogany, they are distinct but not conspicuous, and in some they are the most prominent feature when exposed. As examples of the latter may be mentioned, in addition to the oaks, the sycamore and beech, the Australian silky oak (which is not an oak at all) and others of its family (*Proteaceae*), such as the carvalho and pao concha of Brazil.

When oak is cut tangentially the lumber is commonly said to be plain-sawn in distinction to quarter-sawn which brings out the conspicuous figure. In ash, chestnut and the conifers, whose rays are scarcely visible, the term plain-sawing, as used in connection with oak, is not appropriate.

The exposed rays in quartered oak are often called "mirrors" because of their glassy appearance in proper



A WONDERFULLY BEAUTIFUL BIT OF FIGURE

Panel from one piece of finely figured mahogany which seems fairly alive under changing light.

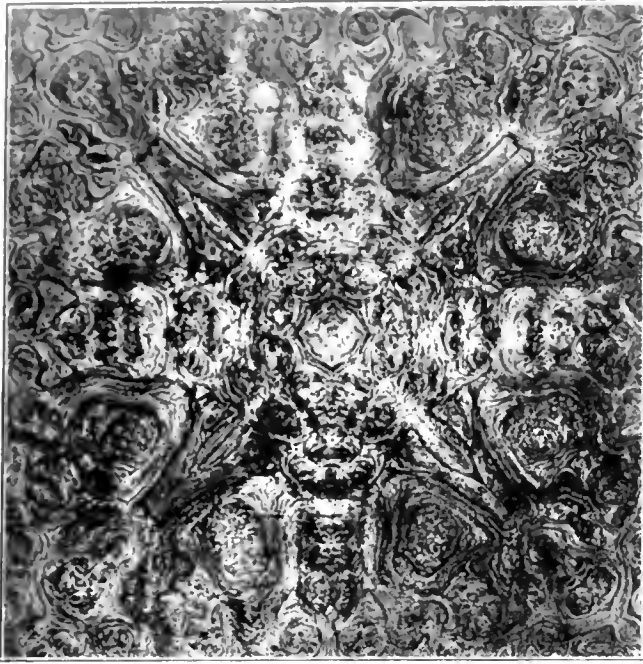
ing figure than the yellow pines because the outline of the growth rings is usually wavy.

Among the hardwoods, the so-called ring-porous kinds, produce figure when flat-sawn. Among these may be mentioned the oaks, ash and chestnut which are so extensively employed for interior trim, doors and furniture. It will be noted that, whereas the pines and other coniferous woods show light-colored spring wood and dark late wood, in the hardwoods just mentioned this condition is just reversed. Here the open porous layer of the spring wood absorbs the light while the denser band of summer wood reflects it. In tangentially sawn material the elongated ovals and irregular parabolas of the lighter areas have a fringe of vessel (or pore) lines long or



THIS IS A GOOD EXAMPLE OF WRINKLE MOTTLÉ

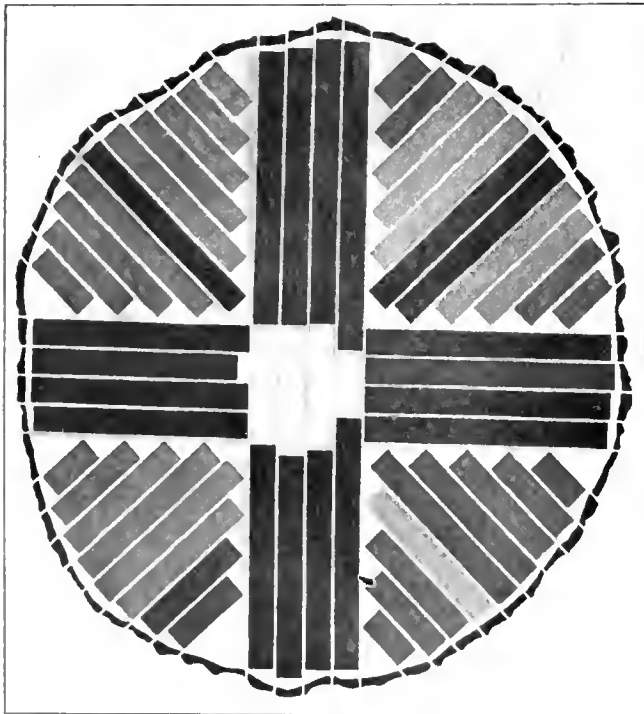
When the figure appears on the smooth surface as though in relief it is called "mottle."



A WEIRD AND FANTASTIC EFFECT

Large table top made from eight pieces of Persian walnut veneer cut from a burl. It requires little imagination to see in this innumerable faces and grotesque objects.

light. The term "silver grain" is also applied to the figure produced by the rays. Examination of an oak desk, filing cabinet or piano, will disclose a wide variation in the appearance of the rays, depending largely on the plane at which they are exposed by the saw. Thus they may be wide or narrow, long or short, straight or curved.



METHOD OF QUARTER SAWING

Showing clearly the means employed to cut through the log radially, or in lines radiating from the center, to get the grain effect so popular and familiarly called "quarter-sawn".

These various figures are sometimes given names by the trade, such as "splash figure," "pencil stripe," "herringbone," etc.

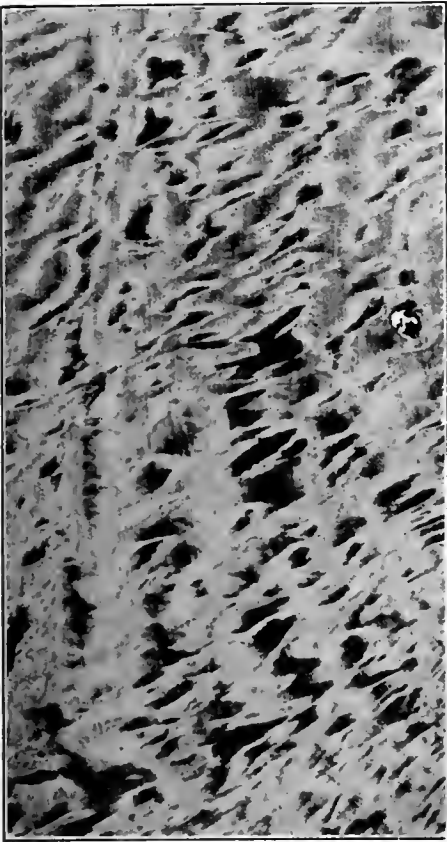
There is another kind of figure which may be brought out prominently in certain kinds of woods, mostly those of tropical origin. This is variously known as roe, ribbon grain, feather grain, etc., and appears as narrow to broad longitudinal stripes, alternating light and dark. This is due, not to actual differences in color, but to the way in which the light is reflected by the different layers. In woods such as these the grain is not straight nor does it run in a single direction; instead it is in alternating spirals. Thus if a specimen is split into a series of tan-



THE WAVY GRAIN VALUED BY CABINET-MAKERS

A panel of curly longleaf pine showing "Landscape Grain", so called because of its resemblance to a contour map.

gential planes at various depths it will be noted that the grain at one depth is growing in a left-hand spiral around the trunk, at another depth is growing in a right-hand spiral, while between the two it becomes straight. In the case of *lignum-vitae* the writer found that these spirals do not extend around the tree, but weave back and forth giving a lazy-S appearance on the exposed surface of a log. When these layers are cut through radially part of the fibers slant in one direction, part in another and the variation in amount of light reflected and absorbed causes the light and dark appearance, just as the luster



A SATIN-WOOD PANEL

This wood has a rare luster which makes the name satinwood very appropriate.

of pile fabric is changed by the direction in which the nap is smoothed. If one takes a panel of ribbon-grained wood and rotates it slowly in the light he will see the shifting of the light and dark ribbons. This is well illustrated in mahogany and our native sycamore.

Wavy grain is very common in some woods and likely to occur in any species. Here the fibers weave back and forth in a single plane. If the pattern is small it is usually called curly grain, though though this term is also applied to various irregularities of growth. In the crotch of a forked tree, at the junction of limbs and at the flare of the root the fibers are folded and wrinkled and local deposits of pigment are common. This results in highly figured material which in the cabinet woods is in demand by the trade. Most of the figured walnut comes from the stumps, though not all of the stumps by any means are suitable for this purpose. Some of the finest figured mahogany is from the forks of the tree and the figure varies with the angle of the crotch, the tightest grown producing mahogany "curls," some of which resemble the spray of a fountain or a cluster of plumes.

When any figure appears on a smooth surface, as though in relief, it is called mottle. There are innumerable kinds of mottle, some of which

have been named. The fiddle-back mottle appears a series of hills and valleys and derives its name from the common use of maple with such figure in making the backs of violins. The figure results from the proper cutting of wavy grained material and the effect from different lighting is the same as described in roe or ribbon grain.

And then there are plum mottle, wrinkle mottle, landscape mottle or grain and bird's-eye. The last is found in many woods, but is most common in hard maple. The cause of bird's-eye has never been satisfactorily explained. In some instances it may be due to small buds, in others to the action of woodpeckers, but in all of the ordinary cases examined by the writer there is no evidence of these factors. The surface of the log is pitted and spines on the inner bark project into these pits. Where buds have been noted the projections are outward. In pine, elm, Douglas

fir and especially in Sitka spruce it is common to find the surface of logs irregularly grooved with so-called "bear scratches," with ridges of inner bark fitting into them. The cause is unknown. The finished wood shows peculiar worm-like tracings due to the distortion of the fiber. Many instances of this were found in airplane spruce and was erroneously ascribed by some inspectors to the action of mistletoe. In lodgepole pine a pe-



BALD CYPRESS

Most of the figure is due to color variations.

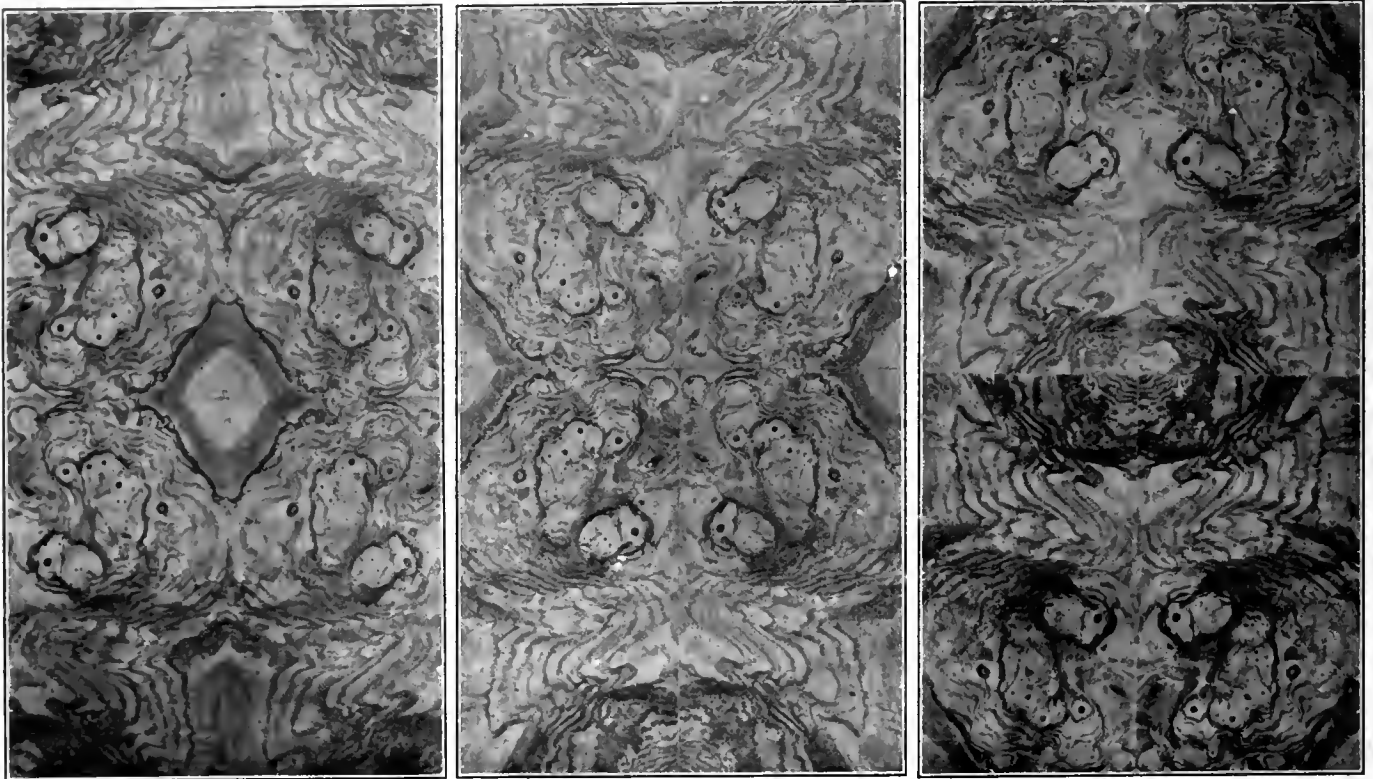


FIGURED BLACK WALNUT PANEL
Always distinctive and beautifully rich in color.

cular dimpling is produced by the action of rosin blisters in the bark which press into the cambium and cause the new wood to be molded around them.

One of the greatest sources of ornate wood is to be found in burls which are malformations of tree growth produced by insect attack or other pathologic condition. The most valuable burls are found at the roots. In walnut they often weigh from 500 pounds to a ton. They are so likely to be defective that it is a gamble as to how they will open up in sawing. There are thousands of little buds with little circlelets of wood about them and irregular pigment deposits which work up into fantastic designs with little or no resemblance to normal wood. The bowls of briar pipes are made from the burls of va-

handles, is due to irregular pigmentation. Many of the woods of the ebony family, to which our common persimmon belongs, are highly figured. The marble wood is black and white, the Macassar ebony is black and reddish brown the camagon of the Philippines is a mingling of various light and dark shades. The yaya of Columbia is a nearly white wood with piping of dark green, a rather unusual color in wood. The snake wood or letter wood of the American Tropics, a member of the mulberry family, has peculiar black streaks which, instead of running up and down the tree, radiate like the spokes of a wheel and produce a pattern suggesting snakeskin. This wood is principally in demand for canes and small turned articles, as it is extremely dense and the core of heartwood, which



THREE PANELS FROM THE SAME VENEERS

The first is a panel made by matching four pieces of veneer sawed from an ash burl. The other two show other designs which might have been made from a different arrangement of the same pieces of veneer.

rious shrubs belonging to the heath family—the American “briar” coming from the mountain laurel. The California redwood supplies burls which are made into all sorts of novelties and souvenirs.

Mention has been made of irregular deposits of pigment. Some finely figured woods owe most or all of their decorative value to this condition. Figured red gum, also variously known as “hazel,” “hazel pine” and “satin walnut,” has a background of brown with a beautiful “watered” effect of dark color on it. Circassian walnut combines this irregular coloration with the grain produced by the growth rings and exhibits a more pronounced figure. The figure of Brazilian rosewood and of the goncalo alves, a South American tree of the sumac family, and of the cocobola so extensively used for tool

alone is figured, is very slender. English oak owes much of its attractiveness to a peculiar mottling of dark brown which is said to be the work of a fungus. In many instances the color of wood is decidedly changed by fungous attacks.

In order to make the most of figured woods it is a common practice to cut them into thin layers called veneers, which are glued to a base or core of some less valuable lumber. There are three ways of cutting these veneers, one with a saw and the other two with a knife. The saw used has a very thin edge and the veneers, which are usually about one-twentieth of an inch thick, may be finished on either face. This is a decided advantage where it is desired to match the pieces and build up patterns, and to this end veneers from a single log, stump,

or burl are kept and sold together. Panels for fine furniture and cabinets are often made by matching four pieces so that a regular quadrilateral figure is produced. All sorts of fantastic shapes and figures may be secured in this way from burls and other gnarly growths.

In the method known as slicing, a rectangular timber called a flitch, after being softened by boiling, is placed in a ponderous machine and brought down against a sharp knife extending the full length of the timber and very thin layers of wood are shaved or sliced off. Spanish cedar for veneered cigar boxes is prepared in this way.



U. S. Forest Service

A TREE SHOWING THE WORK OF WOODPECKERS

Some hold these busy little birds responsible for the figure in maple commonly known as "bird's-eye"; but this has never been established.

In rotary cut veneer the log is turned against a knife and a long strip removed, giving the impression that a log is being unrolled like a roll of wrapping paper. Such veneer is, of course, all tangentially cut and in the case of woods with pronounced growth rings and color variations, very striking figure is produced in large sheets without splicing. The ceiling of a car may be covered with a single piece of bird's-eye maple cut in this way.

The artificial "graining" of wood has been practiced for a long time and some of the results obtained by the modern methods of printing from a master roll of real wood are remarkably realistic. Through this means it

is possible to impart a good imitation of mahogany to plain colorless woods and to metals. But there is one thing that such imitations lack and that is the "life" of the real wood, whether solid or veneered. The imitation is at best only a picture which is ever the same, while the real wood responds to every variation in the lighting and presents a new aspect with every change in our angle of vision.

THE SONG OF THE PINE

Sometimes my voice is a thunderous roar;
Sometimes 'tis the softest sigh.
Elfin songs are sung at my door,
I harbor the lion's cry,
And I sing to myself in my solitude—
For a giant alone am I.

As my needles pick out sharp tracery
Against the moonlight cold,
From the edge of a hole in my sturdy bole
The night owl's cry is rolled.
The chipmunks scamper along my limbs:
The squirrels chatter and scold.

Though I snap and crack when the Frost King's free;
Though I stand as straight as a line,
Yet I sing you the softest lullaby
With the wind through my needles fine:
For I am the restfullest, gentlest tree,
Although I'm a mighty pine.

I bring you strength through the hours of light,
And—when dark shadows creep—
I breathe my balsam to fill your night,
And send you to slumber deep.
For I am the symbol of quiet strength—
And I am the spirit of sleep.

—Orville Leonard.

ON his recent visit to the Philippines, Gen. Leonard Wood planted a memorial tree in the Forest School grounds as a living memorial of the great American whose close friend and confidant he was—Theodore Roosevelt—a staunch advocate of conservation.—*The Ranger*.

A HIGHER course in forestry at the Forest School, University of the Philippines, is being considered. Plans are under way to reopen the advanced course in forestry which since 1914 has been closed, due to lack of competent instructors and professors.—*The Ranger*.

THE United States leads all nations in forest fires. Over 30,000 forest fires occur annually destroying about \$20,000,000.00 worth of timber and property. About 85 per cent of these fires are caused by human carelessness.

PONY BLIMPS FOR FIGHTING FOREST FIRES

BY WALLACE HUTCHINSON

THE mastery of the air bids fair to solve the crucial problem of the forest fire game—Speed.

It's a long step from the days of the "smoke chaser" riding his lonely forest beat to the 100-mile-an-hour airplane patrol winging its way over mountain and plain. Between these two extremes lies a period during which track speeders, motoreycles, motorboats, trucks and automobiles rose to varying heights of popularity as a means of transportation for patrolmen and fire fighters. Many of these vehicles have found their niche, and their use has settled down to a work-a-day basis. Not so with the airplane. Before our enthusiasm over its use has even commenced to cool, up bobs the Pony Blimp competing for a place in the air.

The Pony Blimp is a small dirigible, manufactured by one of the leading tire and rubber companies of the United States. It seems to embrace all the merits necessary to a vehicle for the transportation of fire crews and supplies, and as a means of effective patrol and fire de-

tection service. The makers specify these advantages for the Pony Blimp: A cruising range of eight hours; speed of from one to 50 miles per hour; ability to buck stiff winds, making 10 miles an hour in the teeth of a 30-mile gale; control of elevation, flying from 25 to 50 feet of the earth as well as at several thousand feet altitude; maneuvering readily at close quarters; ability to land on a very small plot of favorable ground; can be held nearly stationary close to the earth; can discharge fire fighters by means of rope ladders while the machine hovers humming-bird-like over a selected spot near the scene of the fire; can be anchored by tying to a fixed object while the crew is absent fighting fire; can be used for transporting supplies and fire-fighting equipment to points of need; low cost of operation.

The Blimps will be equipped with a Lawrence motor developing about 75 H. P., and will carry three or four persons in addition to the pilot and mechanic. The price of the "ships" will be approximately \$12,000, and the



ALL READY TO START

This is a pony blimp on fire patrol duty over the Angeles National Forest, Los Angeles County. Forester Stewart D. Flint-ham and Asst. County Forester Spence D. Turner (center and right figures on ground) examining a map of the patrol route. Supplies for the blimp,—gas, oil, etc., are in the trailer.

operating cost is figured at 24 cents per mile, including total maintenance of the Blimp for 24 hours, or an actual flying-time cost of 2 1-2 cents per mile. Buoyancy is secured with hydrogen gas; 20,000 cubic feet per month being required for continuous operation. This gas is available in steel containers, holding 191 cubic feet, in all large cities.

The piloting of a Blimp is said to be rather more complicated than that of an airplane, as the operator not only has his motor and steering apparatus to control, but also the gas pressure in the bag. To maintain the proper relation between the weight of the cargo and the buoyancy of the bag at varying altitudes, air is admitted to the hydrogen. This operation requires highly developed skill and technical knowledge.

During the 1920 fire season, a test of the Pony Blimp was made over the Angeles National Forest in California

with excellent results. The dirigible cruised a number of narrow canyons for their entire length within a short distance of the ground, and otherwise demonstrated the practicability of the machine for patrol and fire-fighting work. As a result of this trial, officers of the United States Forest

Service are of the opinion that the Pony Blimp offers a practical solution to many of the forest fire problems in our country. Each year, from 6,000 to 7,000, or more fires occur in the 156 million acres of National Forests, many of which are in remote parts of the mountains

where travel and transportation are difficult and at times impossible, due to lack of existing roads and trails. Here fires often gain tremendous headway before crews of men, equipped with fire-fighting tools and supplies, can be brought into action against the flames.

The use of Blimps would materially alter such conditions. With machines cruising regular patrol routes, it would be possible for observers to "spot" fires in their early stages, and radio the location of the smoke to the nearest base camp where a Blimp, equipped with tools and supplies and manned by a crew of experienced fire fighters, could take the air on short notice. On reaching the scene of the fire after a fast run, a suitable landing place would be selected nearby, the fire crew lowered to the ground by means of rope ladders, and the machine anchored until the fire was put out. Their work done, the crew would return to their base station by the air route, and await the next call to action.

"Minutes count" in fighting forest fires. A lightning struck tree, a camp fire left smouldering, a lighted match or cigarette carelessly thrown aside in the forest may, if not promptly "spotted" and fought, cause a conflagration that will take days and weeks



(Photograph by courtesy of the Goodyear Tire and Rubber Company).

THE PONY BLIMP ABOUT TO START OFF ON AN EMERGENCY CALL

Fully equipped for the transportation of necessary crews and supplies, it is believed that this speedy little dirigible will prove an important factor in the successful solution of the fire forest fighting game.

of hard work to extinguish, and result in the loss of thousands of dollars worth of timber and property. The Pony Blimp, if it lives up to its reputation for speed and efficiency, will prove the biggest factor yet discovered toward the successful solution of the fire fighting game.

HOW IT HAPPENED

BY CLIFFORD E. DAVIS

This is the match with the phosphorent end,
That a hunter passed to his city friend,
Who struck it, lighted his brown cigar,
Then, looking not, tossed the match afar.

Engrossed with the topics of the day
The two passed on their careless way;
While the match fell on a leaf pile dry
And smouldered—kindled, and then blazed high.

A light wind fanned it; and soon it ran
Faster than horse, defying man.
The blaze to tree tops began to soar
Announcing its power with a sullen roar.

The wild game, frightened, at top speed fled
But hundreds, pitifully, soon were dead.
As were thousands of trees that the whole world needs,
Burned,—even slips, and forest seeds.

And all because "personal liberty" let
A fool, with a match, all sense forget

ADIRONDACK FOREST MUSINGS

BY E. A. STERLING

YES, the East is cut out; the white pine is gone; the spruce cut or going. From the East, the South and the Lake States the lumberman must move to the Pacific Coast as his mill makes its last run; at any rate he must choose between the virgin timber of the western field, small local tracts at high stumpage cost, or going out of the lumber business. Proof that this general conception of the situation is correct is found in the startling fact that the region within a 500 mile radius of New York City annually consumes some 10 billion feet and produces three; that the wood-using industries of New York State alone import 85 per cent of the lumber con-



BEAVER DAM ON WARD'S BROOK, WHICH HAS RAISED THE WATER LEVEL OVER THREE FEET. THESE INDUSTRIOUS ANIMALS HAVE INCREASED GREATLY THE PAST FEW YEARS AND THEIR DAMS ARE FLOODING AND KILLING CONSIDERABLE TIMBER IN THE ADIRONDACKS.

sumed, Connecticut produces only 15 per cent of its requirements, and New England has under 5 per cent of its original forests left.

This accelerated trend in lumber production towards the West is important to the public and vital to the lumber industry of the East; yet we find in the Adirondack region of New York State that lumbermen have moved east from Michigan and north from Pennsylvania into fields of plenty. This changes the broad phases not a whit, and these fortunate exceptions, with those previously on the ground who still hold sizable areas of convertible timber, are like rabbits in clover with markets for every kind and grade of forest product at their door. And with this market they are the ones who can afford to plan continuous production if their holdings are large enough; to them the cycle of values, based on available supplies, has brought forestry into the status of a commercial asset rather than a vision.

So in our consideration of shifting timber supplies and of the exceptional operations which do not change the economic trend, we come to the little lumber-built village of Tupper Lake, New York. In the heart of the Adirondacks, founded as a mill town many years ago, existing through the changing years with a prosperous sawmill at its back and now looking forward confidently to at least 30 years more as a lumber town, "Tupper" is at least unique among North woods villages. Elsewhere in the Adirondacks the lumber settlements have become tourist resorts or gone to seed, except in the few cases where pulp or paper mills give permanence, but Tupper Lake continues to prosper from its mill and logging operations, with tourists making little impression as they pass to and fro or tarry on the shores of its adjacent lakes and streams.

The past in this Adirondack center is closely linked with the present in the Santa Clara Company, which for many years has brought its drive down the Raquette and manufactured spruce lumber in a mill at the edge of the village on the shore of Raquette Lake. This mill is still turning out its hundred thousand feet per day during the summer season, and if the "whine of the saw"



LOADING HARDWOOD LOGS AT CROSS CLEARING, EIGHT MILES FROM TUPPER LAKE. THE END OF THE FIRST LOGGING ADIRONDACK RAILROAD BUILT TO HAUL HARDWOODS. THESE LOGS WERE PRODUCED IN THE DEMONSTRATION CUTTINGS OF THE NEW YORK STATE COLLEGE OF FORESTRY OF CORNELL AND WERE MANUFACTURED INTO SLACK COOPERAGE.

is not heard on the village streets as proof of an industry still running strong, it is because this mill runs too quietly and efficiently to have anything to whine about.

For it is a model of its kind and size, with a wide repu-

tation for economy and a record for output per rated capacity which is known and envied throughout the whole north country. Built originally as a "double band," it has been refitted and improved until now, on a single band and gang, it makes its daily addition of 100,000 feet to the stock piles as regularly as the working day comes, and under a burst of speed and tightening of efficiency, has turned out a record cut. But hanging up a record is not the aim nor end of the management, but rather the regular delivery of the season's log cut on the spring drive, and the everyday sawing of good boards. Complete utilization is actually practiced, the small logs not suitable for boards being cut into pulpwood bolts and rossed and the waste pieces converted into chips for pulp, so the burner stands only as a monument to earlier market conditions when waste was waste because it could not be sold.

The third generation of a family of lumbermen is represented in the present Santa Clara management. Here is no "shirt sleeves to shirt sleeves in three generations," but a family which has written its name large and clear in the annals of Adirondack lumbering. Their logging



LOGS ON AMPERSAND BROOK READY TO GO OUT ON THE SPRING FLOOD WATERS TO THE SANTA CLARA MILLS AT TUPPER LAKE.

operations around Mt. Seward and on its steeper slopes have called for the application of highly developed methods on difficult ground, but in taking the commercial softwoods, fire protective measures were applied so effectively that valuable stands of young conifers and virgin hardwood were left on the extensive areas purchased recently by the State for incorporation into the Adirondack Park. A large area in the most beautiful part of the Ampersand region, made famous by Dr. Henry van Dyke in Little Rivers, and known to those who wander off the beaten paths as one of the gems of the Adiron-

dacks, has been held for many years as the Santa Clara Preserve, while on portions of the cutover land plantations have been established to maintain a forest cover.

Of more than passing human interest is the fact that Eugene Bruce, the well known and widely beloved logging expert of the Forest Service, who died last summer in Washington, was a man from the Tupper Lake region, of long service with the Santa Clara company. When the drive was hung up or a difficult logging problem encountered, it was "Gene" who was sent for, and he never



AMPERSAND POND. THIS IS PART OF A PRIVATE PRESERVE IN THAT FAMOUS SECTION OF THE ADIRONDACKS MADE FAMOUS BY DR. VAN DYKE'S "LITTLE RIVERS."

failed to put it through. Nor was his field limited to logging, for a better all around woodsman and guide was never raised in the north woods. He knew the ways and haunts of the game, was a crack shot with the revolver and rifle and an expert in the water, whether in guide boat or on a burling log. To him many men in responsible positions today owe their knowledge of woods craft and logging, not to mention the inspiration of a virile character strong enough to go from a place as woods foreman in a little northern village to a position in the federal service, where his field and reputation became nationwide.

Tupper Lake's past was founded on softwoods; its future is assured by hardwoods. The transition is gradual with the full separation still to take place. Twenty years ago hardwood was considered of little value, with efficient logging methods still to be developed. Then through the vision of a man trained as a forester in European schools and theory a slack cooperage plant was established at Tupper Lake, which was *the first extensive hardwood utilization plant in the Adirondacks* if not in the whole northern forest. *And his object in starting this plant was to get rid of the hardwoods so that a softwood forest could be planted in their place.*

Today, between Tupper Lake village and the Junction stands a steel and concrete plant devoted exclusively to

the intensive manufacture of hardwoods. This Oval Wood Dish Corporation plant is not only one of the largest and most modern of its kind, but it is backed by a supply of standing hardwoods which will last for at least 30 years. A reasonable degree of permanency is, of course, necessary for an expensive plant of this kind, and in the Adirondacks was found the necessary supply of birch, beech and maple which justified the heavy investment made. This company started in a small way in Michigan many years ago, the management passing along from father to son with a steady expansion to the present large dimensions.

One is surprised to find such a large manufacturing enterprise in the heart of the Adirondacks, and this feeling of amazement is strengthened on going through the

themselves, but to the forester the most striking thing is that they are converting the Adirondack hardwoods, the profitable removal of which has always been a difficult problem, into millions of articles which find use in thousands of homes.

Over the hills a few miles away is another large timber holding and operation devoted to the manufacture of hardwood lumber. This Emporium Lumber Company tract and mill also found in the Adirondacks, after years of cutting in Pennsylvania, a supply ample in amount and suitable as to quality for their requirements. Here also much thought has been given to practical utilization and to the protection and regeneration of cut-over lands. One of the best known and most competent lumbermen-foresters in the United States said, after visiting the prop-



PLANTATION OF SCOTCH PINE NEAR AMPERSAND POND, SANTA CLARA COMPANY. THIS COMPANY HAS FOR MANY YEARS BROUGHT ITS DRIVE DOWN THE RAQUETTE AND MANUFACTURED SPRUCE LUMBER IN A MILL AT THE EDGE OF THE VILLAGE ON THE SHORE OF RAQUETTE LAKE. THIS MILL IS A MODEL OF ITS KIND AND SIZE, WITH A WIDE REPUTATION FOR ECONOMY AND A RECORD FOR OUTPUT.

plant. Here is found the complete utilization which means actual conservation of forest resources. In an overmature forest which is past its prime, logging is done as closely and to the smallest sizes which it is possible to use. At the mill these logs, despite the large percentage of defects in some cases, are converted into products which include lumber, clothes pins, oval-cut dishes, veneer stock for many classes of stapled dishes, boxes, and various novelties. Practically nothing is wasted, because all of the sound wood from blocks and veneer logs is converted into usable products, and the defective or waste pieces find ready market for fuel. The processes and almost humanlike machines which produce the varied assortment of wooden-ware dishes are a story in

erty and talking with the officials of this company, that the plans they are quietly making and the opportunities which they expect to develop, because of the advantages and size of their holdings, give promise of becoming one of the largest and most successful forestry projects in the state, and with the policy contemplated continuous production on the same area is feasible and assured.

What does all of this mean to the forester? It first provides a solution of the long recognized problem of removing and utilizing the mature hardwoods, in order that a more valuable and faster growing forest may take their place. The original conception was that softwood trees should replace the hardwood, but market conditions have so radically changed in the last 20 years that the forest

economics of the case may bring a modification of the former silvicultural plans. In other words, if the trees which grow best in any particular location are made the progenitors of the future forest, it is a reasonably safe assumption that the relative ultimate values of different species will take care of themselves.

The highest wood production from the land, with fire protection and regulation of cutting which assures the maximum volume per unit of area, will provide about all that can be expected in the Adirondack forest or anywhere else. The most that foresters can do is to help nature, and if too radical changes are attempted nature rebels and goes her own way, despite all theories and policies to the contrary. To replace a tract of pure and mature hardwood forest by planting evergreens may succeed, but the natural rotation proceeds by less abrupt stages and ecological influences must be considered.

The first demonstration forest in New York State, if not in America, was located a few miles from Tupper Lake, and here was accomplished the first extensive removal and commercial utilization of Adirondack hardwoods and their replacement by softwoods. If political influences had not prevented the carrying out of their experiment under the theories advocated, much more would be known now after 20 years as to feasible methods and actual outcome. In lieu of this, we have on comparatively small areas, dense, vigorous growing plantations of exotic trees, the Scotch pine planted near Wawbeek and Axton being the commercial pine of Europe which has been transplanted bodily to this new environment. Some experts say that these trees will never attain commercial maturity, despite the fact that at the present time they are healthy and rapid growing. Neither the native nor Norway spruce, planted at the same time, have succeeded as well, although white pine has thrived unless damaged by the leaderweevil. It is an interesting proof of the youth of forestry in America that the white pine seeds planted in the Wawbeek nursery in 1899 were imported from Germany and were gathered from a planted white pine forest near Frankfort which was propagated from seeds obtained in this country over 100 years before. The seeds from our own white pine trees were ungathered and unavailable from seedmen until forest planting became an established practice in the regeneration of our forest lands.

On the demonstration hardwood cuttings where softwoods were not planted, nature with her abhorrence of

barren areas reseeded the ground with a dense stand of miscellaneous hardwood. The composition of this young forest is not all that could be desired, but the ground is clothed and the ultimate suppression of the less desirable brushy growth will finally give a hardwood forest of definite value. On other areas it has been observed that where fire destroyed the slash and the vegetable humus, contrary to the desires of both man and nature, the recuperative power of the forest has shown itself by a restocking with conifers. But abuse of this kind cannot be carried too far, or too long continued, as is evidenced by the most unfortunate phase of the whole Adirondack situation, namely the large areas which have been burned over repeatedly until forest growth of valuable character either large or small is practically lacking. Here there can be only one policy; that of replanting and stringent fire protection.

Foresters have advocated the removal of native Adirondack hardwoods, and if the accomplishment of this turns out to be the best for the forest it will be from continuous wood production by private owners, because it pays, or through the ultimate incorporation of cutover lands in the state preserve. In either event, the Tupper Lake region is one which foresters will watch and study with much interest and profit, while from an industrial standpoint the new lease of life given by hardwood production is an advantage to the community as well as to the State. The transition period is at full flood with beech, birch and maple replacing the white pine, spruce and balsam and hemlock which has been coming into the Tupper Lake booms for many years. There is still some mature softwood within reach of the Raquette, but even if the best forestry is practised and it proves feasible to replace the hardwoods with conifers, it will be a long time before logs from the new softwood forests will begin to come down on the spring drive. In the meantime, pending the stabilization of theories and policies, the best promise of forestry is in active manufacturing operations on a large enough scale to justify long-time production and permit complete hardwood utilization. Such private enterprises, combined with the elimination of the constitutional bar to state forest management would ultimately create an Adirondack forest of high productivity, instead of one from which income is restricted or prevented, and the deteriorating trees preserved as souvenirs, while the people of the state import their wood products from distant points.

MATERIALS for the successful exploitation of a paper industry in the Philippines are plentiful, says a Bureau of Science bulletin. Cogon (a tall fibrous grass), soft grasses, and forest trees abound in the Islands. Cana bojo, a species of bamboo grown in various sections of the Philippines, but more especially in Central Luzon, produces high grade paper, experiments show. Cotton, rags, and office paper refuse would also make excellent paper material. The Philippines can never be lacking in high grade materials for paper making, and tremendous possibilities await the pioneer in the industry."

THE forests of the Philippine Islands are valued at \$400,000,000, and could well afford a good source of revenue for the government, says the Director of Forestry of the Philippines.

"If these forests," he points out, "are properly handled like the forests of other countries, money could be invested on them by prospective lumber dealers by selling or leasing them. And should this happen it is a sure thing that our government wouldn't be floating bonds in the United States as it is doing now."

THE ANCIENT FOREST OF CAMALDOLI IN ITALY

BY NELSON COURTLANDT BROWN

(WITH PHOTOGRAPHS BY THE AUTHOR)

NESTLED high in the cool silver fir solitude of the Tuscan Apennines and far removed from the dust and smoke of the busy cities of central Italy, the ancient hermitage of Eremo di Camaldoli, the home of the learned and devout Romualdensian Order of Benedictine Monks, takes one unwittingly and pleasantly back to more peaceful times. It seemed a place quite apart from the thrill and throb of a world war when I visited it, but even then the distant dull boom of the heavy cannon along the Piave River could be heard from the high peaks of the mountain heights above the quiet hermitage. Our high-powered Isotta-Frascchini car seemed quite out of place in these peaceful surroundings, as we noisily drew up the steep grade and stopped with a rush at the ancient gateway of the Priory. We were greeted and welcomed by the quiet Prior, Don Basilio Casadei, and he told us as we strolled

about the story of the place which has been the objective for pilgrims for nearly a thousand years.

In the wave of things religious which followed the Dark Ages and preceded the Crusades, it had become the custom in Italy for the religious leaders to retire at regular periods to some remote retreat for "meditation and prayer," and many of the noble class, renouncing their worldly life of ease and pleasure, went in voluntary exile or assisted others in establishing sanctuaries far removed from the temptations and distractions of urban life. One of the best-known instances of this "new order of things" was the presentation of the famous Monte Alverna, or LaVerna, as it is often called, to St. Francis

of Assisi, by Orlando, Count of Chiusi, a noble of large possessions in the Casentino in 1213, as a retreat for solitude, prayer and meditation. Here St. Francis spent much of his time and one of the features of the activities of his monks and followers was the cultivation of the splendid silver fir and beech forests. Since the year 1224, this fine old forest, which even today, in spite of a somewhat long and arduous journey off the railway, attracts its annual quota of many devout pilgrims, has received

continuous scientific care of its forests and today is one of the municipal forests of the city of Florence with a trained forester in charge. The forest of La Verna is sometimes referred to as the oldest known example of continuous forestry practice. Records have shown, however, according to Dr. Egidio Ferrari, an Italian Government forester, and the Prior Don Basilio, that the beautiful forest of



AN ANCIENT ITALIAN FOREST

One of the beautiful walks through the dark cool forests below the ancient Hermitage and near the monastery of Camaldoli. These silver fir trees have been planted by the monks about 50 to 70 years ago and have received constant and skilled attention in accordance with the terms of the gift of the forest to the sainted monk Romualdo, in the year 1012, by the Count Maldolo.

Eremo di Camaldoli is not only the oldest example of continuous culture under scientific forestry methods, but it served its highest usefulness in helping to meet the great war emergency by supplying much needed timbers and lumber for the front. It seemed that for this very contingency, indeed, it had stored up a great forest reserve and fine old specimens of silver fir from 100 to 200 years of age were felled to meet the urgent call. And still more glorious, its future records will show to an admiring posterity, how of a normal staff of fifty monks, all but nine served their country and humanity by repelling the Austrian invader at the front.

We listened in rapt attention to the story as recited by the venerable and gracious Prior, as we strolled through the hermitage grounds surrounded by and picturesquely set in the tall, sombre, silent forest. In the early days of the Casentino in Tuscany, a monk of noble blood, Romualdo, by name, established a wide reputation for his devotion and sanctity until he came to be called San Romualdo. The Count Maldolo, attracted to him and impressed by his kindly manner, made a present of his large forest domain of about 2,000 acres, lying high along the crest of the Apennine Mountains, about 50 miles southeast of Florence, in the headwaters of the storied Arno. Here the count had spent much time in hunting and fishing while stopping at his forest villa. This was in the year 1012 and one of the stipulations of the gift was that the forest must be maintained for all time in good condition and must be "planted, improved and cultured" according to the most approved principles of scientific forestry. The monks interpreted these instructions literally and as a result of their studies, experiments and observations the forest was kept in an excellent condition, as shown in the archives of the old institution.

Aside from the maintenance of the forest, the monks became renowned for their skill and proficiency in the manufacture of medicines from forest herbs and an excellent cordial, the process for which is kept as secret as that for the famous Chartreuse.

The Benedictine monks of this hermitage maintained the forest down to the year 1866, when it was taken over by the Italian Government. Later it was reorganized and placed under a government forester in 1872, but the monks to this day still wear the same cowl and cream-colored habit and observe the old customs laid down centuries ago. Many pilgrims annually visit the old priory, the monk's cells, the chapels and the interesting old relics, such as an original Della Robbia altar-piece and a fine old 16th century oratory carved in solid Italian walnut.

The old water-wheel-driven sawmill, practically as it was built about 1550, is still used to cut lumber. In 1915, when Italy entered the war, a larger mill was set up and over 3,000,000 board feet of lumber were cut and rushed to the battle front. Fortunately, the forest, as it was lumbered, was replanted at once to silver fir so that in a few years little evidence of the destructive cutting, which has stripped the forest bare in places, will be left.

A large share of the forest is silver fir, with a small portion of beech and a still smaller area of Italian chestnut. The fir has proved to be the most profitable from the viewpoint of financial returns, as well as most pleasing from an aesthetic viewpoint. It is cut at an age of 90 to 100 years ordinarily. Beech may be cut for charcoal at 25 to 50 years of age, while chestnut is maintained largely

for the nut crop. The forest is continually thinned and attended so that the maximum growth is attained and every effort made to exclude fire, insects or disease of any kind. It is said that the Count Maldolo and his family even before the transfer of the property in 1012 to San Romualdo and his devoted followers had for some time been interested in the preservation



IN THE CAMALDOLI FOREST

A shrine in the silver fir forest below the Hermitage where the monks spent much of their spare time in meditation and prayer. A fine new road has been built by this revered spot by the Italian Forestry officials.

and care of the forest. The archives show, however, that such excellent care and attention have been given the forest for the past several centuries that the area of mature and productive forest is larger today than ever before, the inferior species having been discouraged and "weeded out," while vacant spaces have been planted and brought under intensive cultivation. Many of the largest silver fir trees being cut for the army at the front had been planted over a century ago by the monks. Only the mature trees, an amount equivalent to the annual growth of the entire forest was permitted to be cut, and from this yield alone the hermitage made a substantial income. Eventually, as the order prospered, missionaries were sent out from the hermitage as far away as distant Poland and Hungarian Galicia, where the monks



THE PRIOR OF THE HERMITAGE

Eremo di Camaldoli, Don Basilio Casadei, at the gateway of the ancient home of the Romualdian order of Benedictine monks, far up in the silver fir forests along the crest of the Apennine Mountains of Tuscany, in Central Italy.

carried their precepts of forest culture as well as their religion.

At the present time the Forest of Camaldoli, embracing the old Hermitage and its ancient forest, is one of the State Forests and consists of about 3,750 acres. Aside from the forest inspector in charge, there are six forest guards, two forest brigadiers or rangers, and generally about 200 workmen employed, on the nursery of 25 acres, in reforestation work, in road, bridge and trail improvement and construction work, cutting in the woods and in activities about the primitive old sawmill. During war time many more men were employed in getting out logs and timbers.

An annual appropriation of 70,000 lire (\$14,000) was made for the support and maintenance of the forest before the war. The returns were about 170,000 lire annually (about \$34,000), or a net annual profit of about \$20,000 for the entire forest. The forester in charge explained that for the major portion of the forest a net yearly return of about 70 to 80 lire per hectare was obtained before the war. This was equivalent to about \$5.60 to \$6.40 per acre per annum, which is a better financial income than the returns shown for the best French, German or Swiss forests.

The silver fir stands at about 100 years of age, produce from 500 to 800 cubic meters of wood per hectare, while the beech is usually cut at 25 years of age and yields 150 cubic meters per hectare. When left to a maximum age of 90 years the beech will yield up to 450-500 cubic meters per hectare. Before the war, silver fir stumpage was worth about 25 lire (about \$5.00) per cubic meter, under average conditions; during 1918 it was worth 130 lire (about \$26.00). Beech brought 15 lire then, now it is worth 60 lire per cubic meter.

The beech is used almost entirely for charcoal, because when converted into the lighter form it can be transported to market so much easier. In marking trees to be cut for charcoal, the Government foresters leave about 100 trees per hectare (2½ acres) for natural seeding purposes. Before the war, contractors paid 5 lire for wood enough to make one quintal (220 pounds) of charcoal, whereas in 1918 it was 12 lire for the same amount. In one year 750 tons of charcoal were made from this forest alone.

The chestnut crop was an important item in the returns of the forest, an unusual figure to an American forester, a total of 4,000 lire (about \$800) being received annually from this source alone. In Italy several hundred thou-



ART IN WALNUT CARVING

The old oratory in the chapel, carved several centuries ago, in Italian walnut and still in an excellent state of preservation. It is one of the finest of the old Tuscan wood carvings.

sand tons of chestnuts are annually harvested and they have been an important contribution to the critical food supply of the country—about two-thirds of the whole amount being used for chestnut flour, while the remainder was used for roasting and general cooking purposes. Before the war, about 70 lire per year per hectare was paid, equivalent to about \$5.60 per acre, by the contractors for the privilege of gathering the chestnuts or "Marroni," as they are called, whereas during 1918 about 210 lire was received per hectare for the right. The latter means an annual income of about \$16.80 for the privilege of gathering the chestnuts alone from each acre. The lessor does all the work of harvesting and agrees to leave the trees in good condition. It is said that about 330 pounds of chestnuts were obtained per tree in the average orchard. In 1914, the large, sweet nuts brought



MONKS MANAGE THE FOREST

Three of the Romualdian Order of Monks outside one of their cells, where an original Della Robbia forms the altar piece. The monks still retain most of their manners, customs and dress which were in vogue when the Hermitage was established in the year 1012.

6 lire per quintal, or about \$1.20 per 220 pounds. In the city markets; in 1918, they commanded the high price of about \$8.00 for the same amount. This means an average income of about \$12.00 per tree. In many Italian forests, the privilege of harvesting the annual chestnut crop is leased for a period of nine years. The nuts are transported to market on donkey back, each animal carrying an average load of about 200 to 250 pounds in one large sack, a distance of 12 miles to the nearest village which was used as a distributing center.

The lumber from the busy sawmill was sent down a "telliferre" or cable way, in the same manner in which food supplies and munitions are carried up the steep Alpine summits to the men along the high mountain battle front. The mill was equipped with two gang saws, the logs being run straight through, and the plant was kept busy night and day to meet the urgent call for more



THE OLD MONASTERY

The original Hermitage building constructed in the year 1012, when the Forest of Camaldoli was first placed under systematic management. The Prior Don Basilio Casadei in the foreground.

and more lumber. In two ten-hour shifts, the mill had a capacity of about 50,000 board feet per day. Nothing, literally, was allowed to go to waste, the sawdust being used for fuel while the slabs and edgings were made into charcoal or consumed locally as fuel.

The fine old forest of Camaldoli furnishes one of the best examples of the successful results of forestry practice. Although old historically, Italy is still young as a nation, being scarcely 50 years old, and even before the war extensive plans had been made by the Director General of Forestry, Professor Antonio Sansone, and the



THE OLDEST SAWMILL IN EUROPE

The old water-wheel driven sawmill built in the sixteenth century, which is still in operation, cutting lumber from the old and mature trees and which has recently been busy turning out material for the armies at the front. This is no doubt one of the oldest, if not the very oldest, sawmill still in operation in Europe—certainly it is the oldest in Italy.

Minister of Agriculture, His Excellency, Signor Miliani. During the past several centuries, the forests of Italy have been neglected as much as those of almost any other



ITALIAN FORESTRY OFFICIALS

These foresters are watching operations on the Camaldoli Forest. From left to right: Camillo Parisini, general manager of a large lumber company, cutting state forests for the war program; Dr. Egidio Ferrari, chief forester at Camaldoli. Professor Giuseppe Di Tella, of the Royal Forestry College at Florence, and Mr. Martinetti, of Florence.

country, and such forests as those of Camaldoli show practical and scientific examples of what can be done under a systematic and continuous forest practice. Only



THE HERMITAGE AT CAMALDOLI

Looking up the main street of the Hermitage of Eremito di Camaldoli, with the old eleventh century cells of the monks on either side and the Prior, Don Basilio Casadei, standing in the foreground.

about 17 per cent of the total area of Italy is now under forest cover. The professors at the Royal Forestry College at Florence estimate that at least 30 to 35 per cent of the total area of the country should be covered with

forests. Italy is an exceedingly mountainous country and land unsuited for agriculture or for vineyards, or olive trees should be turned into timber growth to supply the increasing demands of Italy. Under normal conditions Italy has been one of the most important lumber importing markets in Europe, and she now sees the wisdom of placing her vast mountain waste under a progressive system of forestry such as has been carried out in France, Switzerland and Germany. After many years of experimentation and trials with various kinds of timber trees, the Italian foresters have adopted the silver fir as the most promising species to cultivate in future forests. Many forests cut to maintain their vast army of 5,000,000 men at the front during the war have been replanted with the silver fir. Austrian prisoners were used for this work in war time. Future generations in Italy, no doubt, will find thousands of acres along the beautiful ranges of the Apennine Mountains, which impress one now as being largely barren of forests, and especially in the hot summer season, covered with a beautiful green foliage of the silver fir which already lends so much attractiveness to the landscape not only at Camaldoli, but at other attractive forest resorts, such as Vallombrosa, Boscolunga and other well-known places in central Italy.

"October is the month for painted leaves. As fruits and leaves and the day itself acquire a bright tint just before they fall, so the year nears its setting. October is its sunset sky; November the later twilight."

"THE FALL"

By William Edward Hayes

SO wondrous now the cloak she gives the world
 Beguiling all with mottled tint and hue,
 She steals across the land in darkness hurled
 And softly paints the dress of earth anew. :: ::
 With chilling hand of death she points in scorn
 To tender bud that fain would seek the sun
 For just another day, and then forlorn
 Its petals close, its life forever done. :: :: ::
 What tale is this the Autumn tells again?
 It softly speaks of swiftly fleeting youth
 That tarries not where memories remain,
 And thinking thus we shudder at the truth. :: ::

OUR race we run so fanciful and free
 Until the Autumn halts our revelry.

FOUR thousand five hundred maple treeplings were sent recently to France from Canada. These maples are to serve as living monuments for that fearless band of Canadian soldiers who fell at the famous battle of Ypres.

THE MOUNTAIN LION, OCELOTS, LYNXES AND THEIR KIN

BY R. W. SHUFELDT

IN the United States we have a number of very handsome representatives of the Felines, the Jaguar, the Ocelot, the Cougar, Lynxes and so on. Most of them have been so hunted and persecuted by man that they are all near the point of extinction, in fact, in most parts of the eastern United States such forms as the Cougar have been completely exterminated. No example of that animal has been seen or shot within the New England States for a period of over fifty years.

Of the many sketches and life histories of the Mountain Lion that have appeared in print in the way of

the species, not one in ten of the old hunters of that region would know what animal was meant. Doubtless Puma and Panther would stand in a similar case in still other districts. Cougar, however, is probably the name by which the species is most generally known.

Owing to man's incessant persecution and destruction of all the larger *Felidae* in all parts of the world, they have become, to a greater or less degree, great cowards, and to this state the cougar forms no exception. So far as the animal is concerned, its attacks upon man have been matters of bitter experience to it, and the species has come



MALE OCELOTS AT PLAY

These handsome animals of the cat tribe are found throughout South America, northward through Mexico, from which country the animal occasionally passes into Texas and southern Louisiana. It is one of the most striking representatives of the family to which it belongs.

magazine articles and works on natural history, one of the fullest, most accurate and interesting ones is from the pen of that great hunter, Theodore Roosevelt. Up to the time of his lamented death, Colonel Roosevelt had hunted and killed more Cougars than any man of his time, and it is worth anyone's while to read what he has published about them.

Any one of the various names given to the animal in its application will depend upon the part of the country where it occurs. Years ago, when the writer hunted through the Big Horn Mountains in Wyoming, and in the Dakotas, this famous cat was generally known as the Mountain Lion, and to apply the name of Painter to

to learn, in time, that it would either lose its life or it would be painfully wounded. At the same time, the latent spirit of its kind will occasionally be aroused, and when driven into a tight corner, a cougar will exhibit considerable bravery. When driven to it, an old male will promptly engage a number of tracking dogs turned loose upon him, and plenty of instances are on record where he has not only successfully held them at bay, but often killed one or more of the most powerful of the pack.

Horses and grown cattle have often been slain by cougars, and such instances are probably by no means at an end in the wilder parts of the country where the

animal is still to be found in numbers. They go abroad during the day as well as the night, but most often during the latter; when hunting their prey they pass, like all cats, noiselessly and stealthily through the timber and the undergrowth. When not engaged in searching for food, they take great pleasure in stretching themselves out, sometimes in the shade, but mostly in the direct rays of the sun, choosing either some ledge of rock or a convenient limb in a tree. They kill many deer as well as other animals, and sometimes even make the unfortunate mistake of tackling a porcupine, the quills of which upon getting into the mouth parts and throat, may result in their death.

The voice of the cougar varies with the nature of the circumstances under which it is uttered. When being mauled by a pack of dogs it gives vent to a l l t h o s e squalls, hisses and howls common to all cats, both big and little, when being badgered. When hunting at night it sometimes gives vent to a terrific scream that may be heard for a long distance.

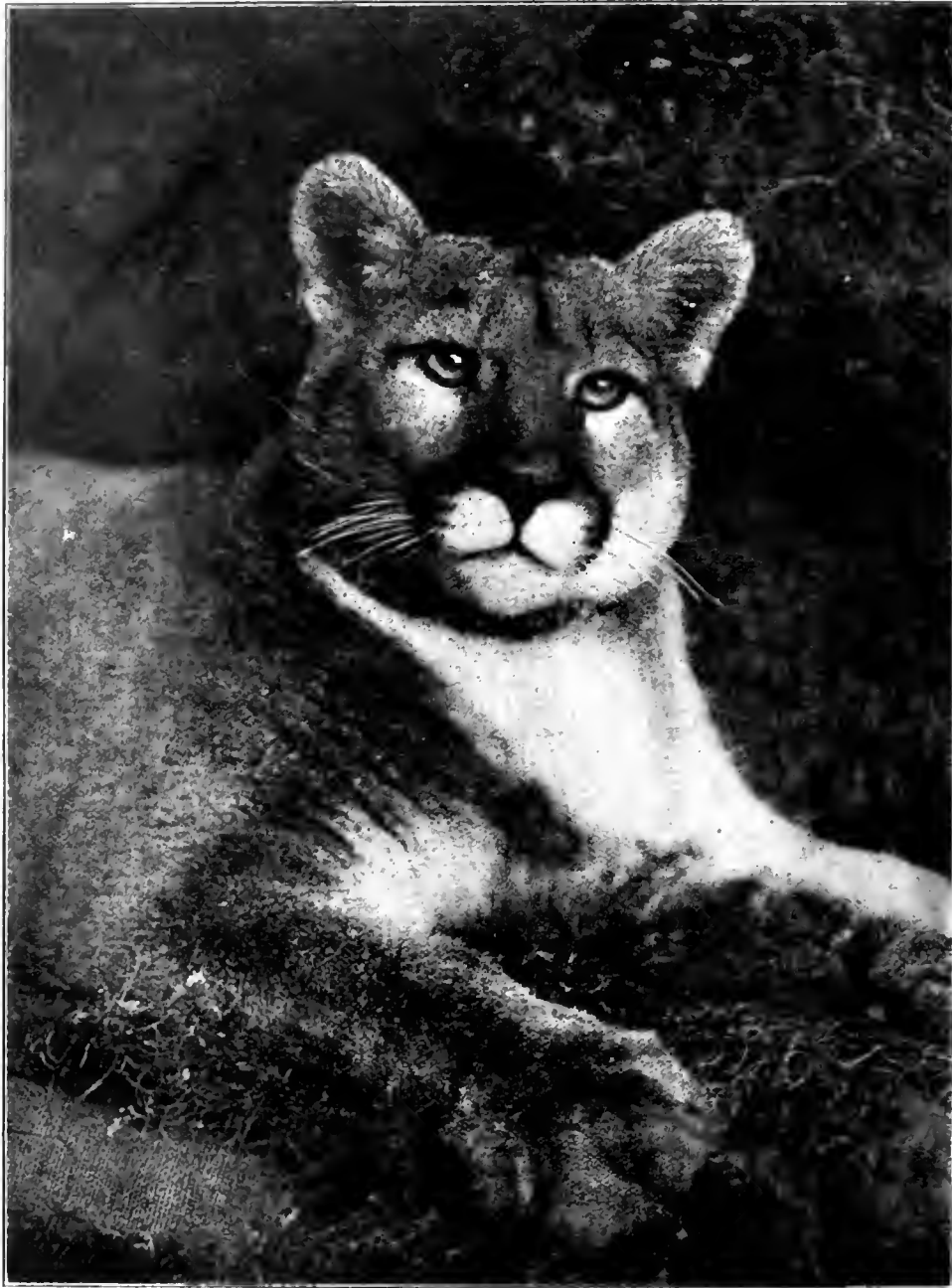
Colonel Roosevelt in hunting cougars had at least two hair-raising close calls, that tried even his marvelously steady nerves in stress and danger. He said "never to move in attacking a panther, who knows he is being pur-

sued, until you are sure of the location of your game. No animal realizes sooner that he is being hunted than the panther, and the instant he does know it his wariness, cunning and native ferocity will appear to a wonderful degree. He never hunts for a fight, and will always avoid one if possible; but when he realizes that 'fight it is,' he follows the advice of a very skilful pug-

list, who said to his pupils: 'If possible, always get in the first blow.' And that first attack will be delivered with a savage rush into the midst of your pack of dogs, and a killing right and left."

According to Colonel Roosevelt, in Colorado the cougars may drop their young at a l m o s t any time between January and June, and the females far outnumber the males. Three kittens is the usual number at a birth.

Some thirty odd years ago Mr. John Mortimer Murphy related for us a good story about cougars, or pumas, as he styled them. He referred to the cougar of Florida, in which State he says the animal is not systematically pursued, al-



THE MOUNTAIN LION

Next to the jaguar this is the most powerful of the feline kin in America. It has a number of common names, such as puma, cougar, painter and panther. The mountain lion formerly ranged throughout eastern North America, but is now extinct in that section. It is, however, occasionally found in Florida.

though the heavily-wooded country affords excellent opportunities for indulging in it. The majority of hunters are more afraid of this powerful cat than of a bear, and seldom molest it unless they have every advantage. It is exceedingly destructive to stock, especially sheep,

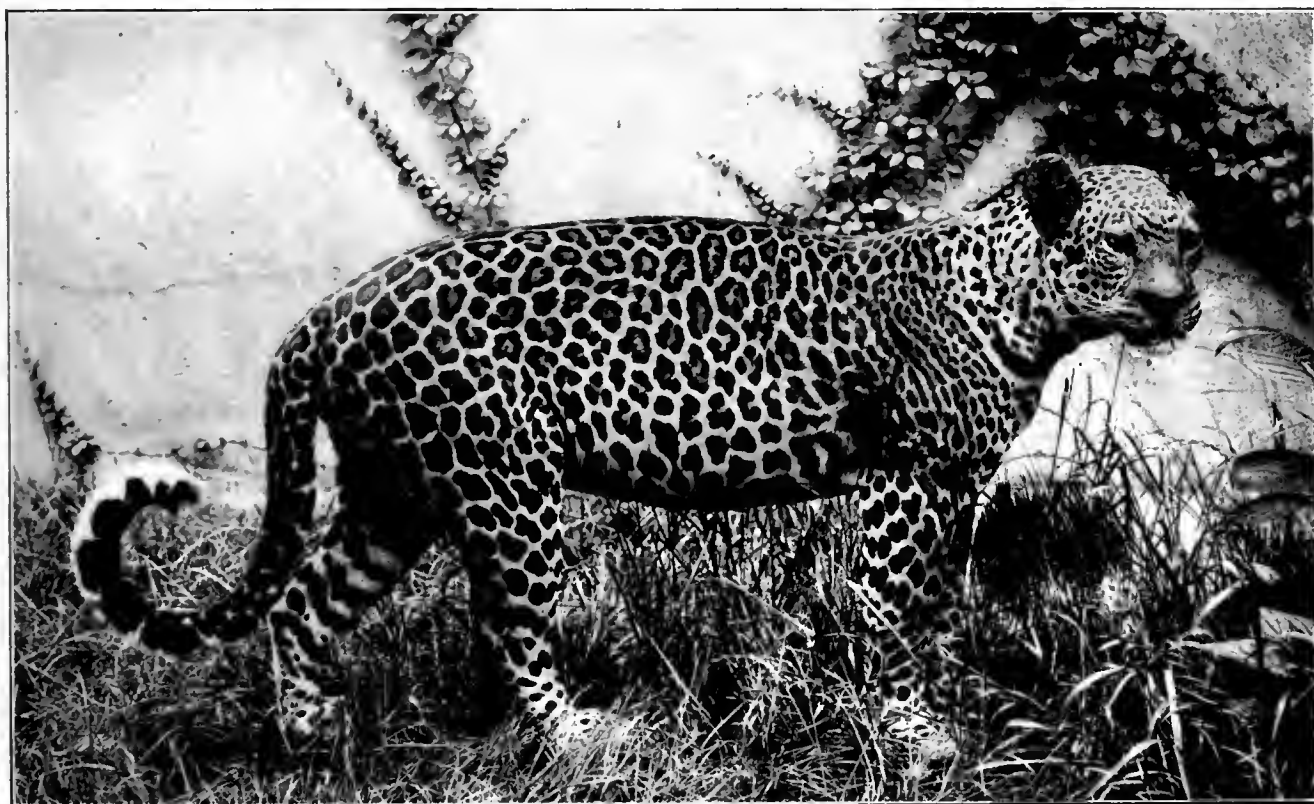
hogs, calves and foals, often seizing them in open daylight under the eyes of their owners.

"When wounded, it fights fiercely, and, if pursued by dogs, moves away in a series of powerful leaps, until it finds shelter in a large tree, where it extends itself on a convenient bough and awaits the arrival of its foes. It may or may not leap upon them from its retreat, but, if it does, some of them will never leave the base of that tree alive. It fights much as a domestic cat does, but far more furiously, and spits and snarls, tears and bites, jumps actively, and humps its back until it looks more like a maniac than an animal with an atom of sense in its head. Being exceedingly lithe and muscular, it can destroy a small pack of hounds in a few minutes, and escape with only a few scratches.

"It is quite an easy matter to follow a fleeing puma,

and by the same method—a draw act, and its long, pointed teeth can pierce the neck of a deer or a man at the first grip of its powerful jaws.

"Some persons consider this animal cowardly because it will not attack man every time it sees him. This is a very poor reason by which to judge it, for not even a lion, grizzly bear or rhinoceros will assail the lord of creation without cause. If these critics were to meet the cougar, when it is suffering from hunger, wounds or even petulance, they would soon change their opinion, and credit it with the courage to which it is entitled. It is true that the burly brute will often follow a man for miles, waiting for a favorable opportunity to attack him, and turn back every time he faces it; but this is characteristic of nearly all the cats, whose only means of securing their prey is to pounce upon it suddenly from selected



A MAGNIFICENT LEOPARD

This is an unusually fine specimen of the cat family from Africa, shot by Col. Theodore Roosevelt. It has been stuffed and mounted by W. L. Brown of the United States National Museum, where it is now on exhibition.

as it always travels in straight lines, and seeks refuge in the most umbrageous forest giants. Its tracks are also easily detected, being round and readily apparent in the moss that often grows at the foot of trees. Good dogs follow its line with much spirit, and on approaching its retreat become wild with excitement.

"Should it bound among them they attack it fiercely, generally on the sides or rear, as they seem to know instinctively that its fore claws are its most dangerous weapons. Experienced animals may have several fights with a puma before being touched; but those more courageous than cautious are liable to be killed at the first onslaught. Its nails cut like a keen Mameluke sword,

positions. Whenever it does assault, however, there is no retreating then; it is victory or death. I have known the animal to injure men for life, and I have seen it turned from its demonstrations for an attack by steadily staring it in the eyes. Few wild animals can face the steady gaze of a fearless man, especially if they are not rendered furious by hunger; yet I have seen buffaloes that could, and did, do it, and ignominiously routed the individual who tried to subdue them by such a method. They would not be stared out of countenance by anybody.

"I am acquainted with a native who caught four pumas with his lasso while they were going at full speed; and I once met a Digger Indian in Northern California

who told me that he had killed one with his pocket knife. The animal jumped on him one day while he was skinning a deer, and he slashed at it wildly with his knife. He was fortunate enough to strike it in the eye, and before it could recover from that blow he thrust his blade into the second eye, destroying both. He finished the assailant at his leisure, and for this accidental feat became a renowned hunter, warrior and sub-chief among his people.

"Cows with calves and mares with foals have been seen to kill pumas; then, again, the latter have been known to be victorious."

In former geological ages there ranged over the territory we now know as the United States some enormous representatives of the cat tribes; these have, ages ago, become utterly extinct. The most formidable among them were the famous sabre-toothed tigers.

Some mammalogists include all the American Leopards in a special group of the genus *Felis* called the *Leopardus* group, assigning the Lynxes to another — the group *Lynx*. The first includes the largest cats in the United States fauna, and, though designated as leopards, they are not all spotted as the popular mind takes all

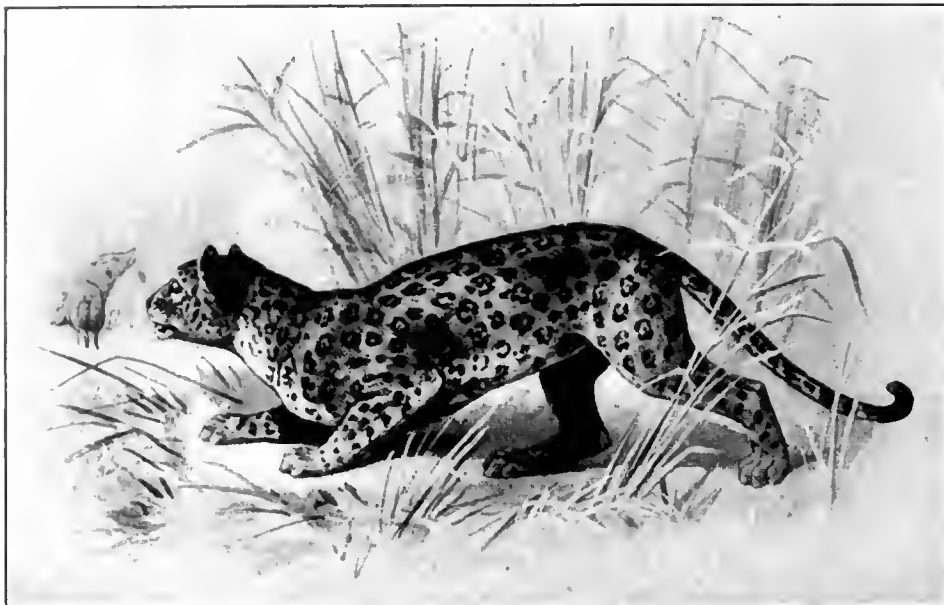
leopards to be. In fact, this only applies to the Jaguar (*F. h. hernandesii*) and the Ocelot (*F. p. pardalis*), while the Yaguarundi (*F. yagouaroundi tolteca*) and the Eyra (*F. cyra*) are essentially plain colored animals. As will be seen from the descriptions given elsewhere, some of the lynxes are spotted, and some are quite plain and devoid of any pronounced markings. Elliot remarks that some of the varieties of the Lynx "hold a very questionable distinctive rank," in which statement I entirely agree with him.

As a comparatively near relative of the Cougar we have, in this country, the Jaguar, a magnificent representative of the *Felidae* or Cat family confined to the extreme southern part of the United States, and they may occur in any suitable region from Louisiana to Arizona. Personally, I have never met with the jaguar in its native haunts, and there are but very few Ameri-

can naturalists or hunters who have. The writer is the first to have published an account of its occurrence in Arizona. It was based upon the perfectly reliable statement of the late Mr. Herbert Brown, of Yuma, Arizona, who wrote in regard to it in April, 1902. In his letter Mr. Brown said:

"I send you the photograph of a very interesting animal which was killed in the Rincon mountains, about twenty-five miles east of Tucson, on the 16th of March last; it was killed by two Mexican scalp hunters. They were in the Rincons, above the Cebadilla, when their dogs found the trail of what appeared to be a very large California lion. After a short run the animal was overtaken, and two dogs were killed in the mix-up that followed. It was finally driven into a cave, smoked out and killed. An examination of the photograph will show where a bullet entered the skull a little to the left of the

right eye; another went through the shoulders, but that cannot well be seen. It measured six feet seven inches from the point of the nose to the base of the tail, and nearly ten feet from tip of nose to tip of tail, nineteen inches around the forearm and twenty-six and a half inches around the head. In the skull you will notice that



THE MEXICAN JAGUAR

This big leopard-like cat often has a length of nine feet from tip to tip. Occasionally it is found in Texas, southern Louisiana and New Mexico, while it ranges southward through Mexico, Central America and South America.

the lower right canine tooth has been broken off, but otherwise the teeth are in perfect condition. The skin and skull are in possession of William C. Brown, of Tucson, to whom I am indebted for measurements and photograph. The animal was a male and very fat.

"I do not think the habitat of this jaguar (*Felis onca*) has ever been credited to Arizona; but you will, I think, agree with me that it is fairly well established. Within the last few years several have been killed in Southern Arizona. One was killed in the Chiricahuas, one in Baboquivaris, and one near Globe. Of the last there were two together, but only one was secured. Another is known to frequent a small range of rocky hills about five miles north of the Tortolita mountains; it was last seen on the ninth of March, and a determined effort is shortly to be made to get it. There are numerous other instances in which it has been taken, but I do not now

definitely, recall them to mind. I have seen several hides brought in by Papago Indians of animals killed in the mountains southwest of Tucson."

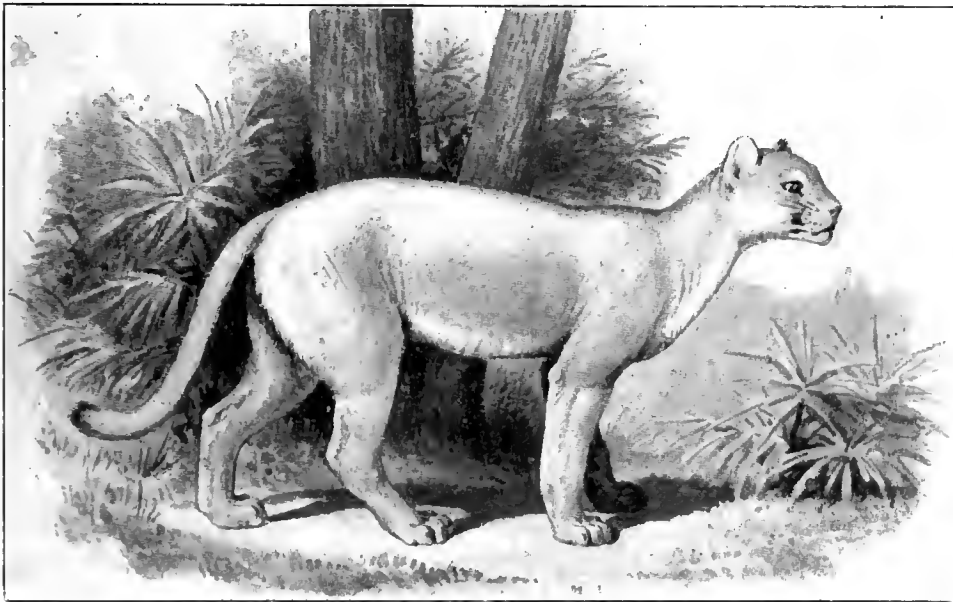
The jaguar will prey upon any animal from a monkey to a tapir, and in *The Living Animals of the World* we read that "The jaguar is as savage as it is formidable, but does not often attack men. Its headquarters are immense forests running from Central America to Southern Brazil; and as all great forests are little inhabited the jaguar is seldom encountered by white men. By the banks of the great rivers it is semi-aquatic; it swims and climbs with equal ease, and will attack animals on board boats anchored in the rivers. As there are few animals of great size in these forests, its great strength is not often seen exercised, as is that of the lion; but it is the personification of concentrated force

and its appearance is well worth studying from that point of view. The spots are larger and squarer than in the leopard, the head ponderous, the forearms and feet one mass of muscles, knotted under the velvet skin. On the Amazons it draws its food alike from the highest tree-tops and the river-bed; in the former it catches monkeys in the branches, fish in the shallows of the rivers, and scoops out turtles' eggs from the sandbanks. Humboldt, who visited these regions when the white population was scarce, declared that 4,000 jaguars were killed annually, and 2,000 skins exported from Buenos Ayres alone. It was clearly common on the Pampas in his day, and made as great havoc among the cattle and horses as it does today."

The Ocelot is a rarer animal in the fauna of this country than the jaguar—in any event, certainly as rare. In some localities, in Mexico and southward throughout South America, they are more or less abundant; but Southern Texas is the extreme limits of their northern range. In times both past and present travelers have published excellent accounts of this, perhaps, most beautiful of all existing cats. The rich and truly elegant markings of its coat almost pass the powers of description, and have never failed to excite the wonder and admiration of every one who has ever beheld them. Then the animal possesses all the grace and playfulness of

the more engaging representatives of the family to which it belongs.

As in the case of the jaguar it is largely nocturnal in habit, and lives in the forest districts, particularly where the timber skirts the borders of streams or bodies of fresh water. It preys upon different species of birds and mammals, and is the veriest terror of the entire monkey tribe. Like most of the *Felidae* it climbs trees with ease and agility, and when pushed by hunters and hounds it will soon resort to that means of escape.



THIS CAT IS FOUND ONLY IN THE WEST

The mountain lion or panther has not been seen in the mountains of New England for the past fifty years and is now rarely if ever seen east of the Mississippi river.

When the kittens are captured they are not difficult to rear; it is said that they soon become as tame as house cats, and fond of their master, with whom they will play and romp with all the good temper of the best-natured tabby. A writer at hand says: "A tame Ocelot described by Wilson, the American naturalist, was most playful and affectionate, but when fed with flesh was less tractable. It jumped onto the back of a horse in the stable and tried to curl up on its hind-quarters. The horse threw the Ocelot off and kicked it, curing it of any disposition to ride. On seeing a horse the Ocelot always ran off to its kennel afterwards. When sent to England it caught hold of and threw down a child of four years old, whom it rolled about with its paws without hurting it."

We very frequently see this beautiful creature in menagerie collections.

Apart from the sub-specific forms of lynxes in this country—the existence of some of which is very questionable—we have, in the United States mammalian fauna, two distinct types of these animals, namely the Wild Cat—also called Bob Cat—Bay Lynx and Cata-mount, and the Canada Lynx or "Loup Cervier." Scientifically, the Wild Cat is classified by some zoologists as *Lynx rufus*, and by others as *Felis rufa*. Likewise, the Canadian Lynx is known both as *Lynx* and as *Felis canadensis*. There is also still a division of opinion whether or not our Canada Lynx and the Old World species (*Felis lynx*) are the same race, being but slightly modified by environment. Wherever we find them, however, either in the New World or in the Old.



SKULL OF THE DOMESTIC CAT

In a general way this gives the characteristics of the feline skull from lions to lynxes.

the habits of lynxes are everywhere much the same, varying only to some extent by their particular surroundings or as they have been gradually changed by the attitude of man toward them.

Throughout the State of Maine and the Northeast, where lynxes occur, the hunters, guides and a few Indians call them the Indian devils.

A writer says that the lynx or "loupcervier" has always been considered a harmless, cowardly animal, unless cornered. He will, however, start the hair upward of the average man with his blood-curdling screeches. They will come within a few rods of a human being in day-time and snarl and spit like an angry house cat. Several years ago I had one keep me company one June evening for nearly a half mile on a lonely road till I reached a knoll where there were plenty of cobble stones, which I hurled with all the energy I possessed, and at that time I was in practice pitching ball. After stopping two or three of the missiles my companion took to the woods, and then vented his wrath in squealing.

"I know of one instance where a family attacked a farmer's flock of sheep and killed about thirty, eight of which were found when alive with the udder entirely eaten out, which was the manner that all were attacked. This, with the robbing of hen roosts, is their chief trait of character while in civilization."

Some twenty or more years ago there was a lively discussion

in the sporting magazines of the day. The present writer took part in this when it came to describing the tracks made in the snow by a bob cat and by a lynx, that is in the differences they presented. Mr. Gill Ford also took a hand in this debate and in one of the articles he published he made comment in words to the effect: "Referring to Dr. Shufeldt's query regarding the visible difference between the tracks of the *Lynx rufus* and the *Lynx canadensis*, I will say that I have often heard guides and woodsmen say that a given track belonged to a loupcervier and another track was made by a bob cat, explaining, when questioned, that the foot of the bob cat was more compact and distinct than that of the lynx. On closer examination they have told me that the loupcervier had a quantity of long hair on the sides of its feet, which fell into soft snow when walking, making a blurred outline; the foot of the bob cat, having none of these filamentary appendages, made a clear impression. My own observation leads me to think the bob cat has a larger and stiffer growth of bristle-like hairs between its toes than its cousin, which may account for the fact that bob cats are often found in clearings and near human residences, while the lynx almost invariably keeps to the woods where the winter travel is easier to its feet.

"As a rule, we old farmers in Maine do not make any distinction between the two species, calling both animals bob cats. The French-Canadians are more observing and nicer in their definitions and term the canadensis species loupcervier (deer wolf), and apply the name of chattecervier (deer cat) to the rufus species. Hunters and fur dealers who size up furs according to their money value, make a sharp distinction in prices, paying about \$2.50 for a good pelt from a canadensis, and turning up their noses in disgust when a rufus is mentioned.



THE LOUP CERVIER

This Canadian lynx is a northern form of the family, a sub-species of it being found in Alaska. The ancients had a belief that a lynx could see through solid substances, such as wood, hence the expression "lynx-eyed."

Hence it has come to pass that no bob cat or lynx rufus pelts are offered in the markets.

"From a varied, though not at all accurate, experience, extending over more years than I care to confess, I believe the loup-cervier—the fellow whose skin brings money—is gradually disappearing before the march of civilization. The skin will always bring some price, which is an inducement. As the animal is a confirmed habitue of the woods, it finds its area growing more restricted every year, and it must soon follow the caribou to practical extinction. Meantime, the sneaking, carrion-devouring bob cat is waxing fat and prospering in the neighborhood of man. Within the past ten years I have seen young bob kittens playing near a hay barn in a back field on two occasions—succeeding years, too—and on asking the men at work on the farm about the matter, I was told that the mother cat had her home under the barn. As the

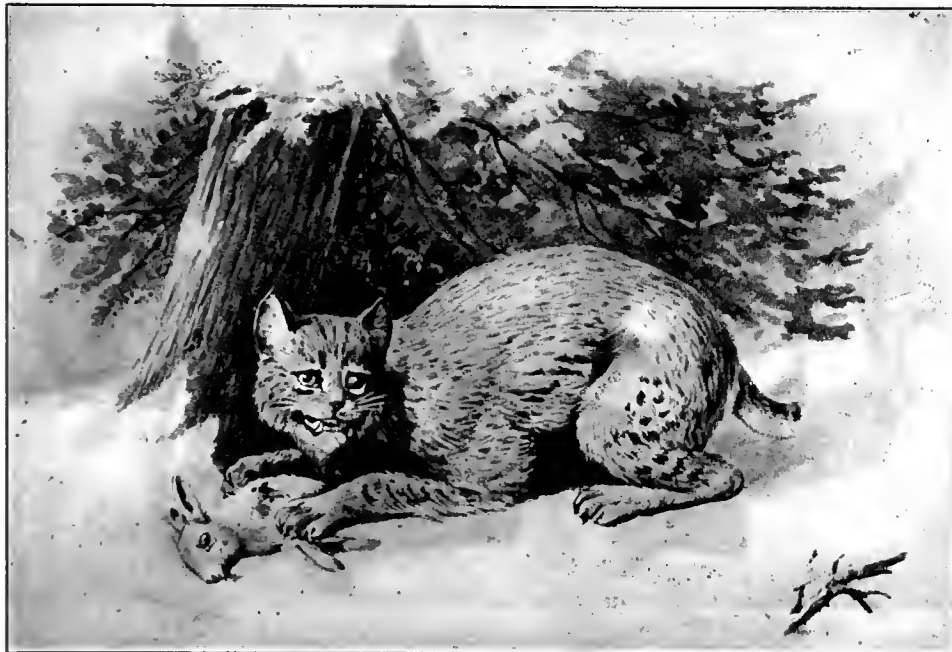
b a r n is not more than 20 rods away from a railroad where cars pass every hour in the day, and as it is a hundred rods from a noisy and active steam saw-mill, I infer that bob cats are not shy. Last summer, when a neighbor of mine went out in the morning to open his chicken pens, he saw a bob cat sneak from behind a pen and stand

at attention. A small terrier dog coming up at the time, the cat climbed a sapling birch and clung to the body of the tree until my neighbor walked a third of a mile to my home and borrowed a gun. On returning to his coops, the cat was still in the tree, and was killed with a charge of BB shot. In two instances I have known bob cats, when treed by dogs, to remain aloft until they were rested, and then come down and fight their way to freedom, killing two hounds in one of the conflicts.

"While bob cats are brave fighters when cornered and will disembowel a dog of double their weight with apparent ease, they are cowardly when met by a man, and will never show fight unless compelled to do so to save their lives or liberties. They are very swift of foot and capable of great endurance. Two years ago

this winter I found the head and fore-shoulders of a big red fox hidden away in the snow at the edge of some bushes. Wishing to know what had killed the fox—for the flesh had not had time to freeze—I turned the hounds loose and soon came up with a bob cat in a tree. Taking the back track from the place where I had found the dead fox, for there was a light snow on top of a light crust, I followed to a field a half mile away, and came upon a scene of a furious combat. The snow was splattered with tracks over an area of four or five acres, and near one side of the multitude of tracks was a great smooch in the snow, showing where the tragedy had taken place. For some rods around the dent in the snow were spatters and daubs of blood and tufts of hair. Of course, I cannot certify that the blood came from a fox, but I believe it did. As for the hair, that grew on a red fox beyond doubt. Until this discovery

I had not placed raw fox among the articles on the bill of fare of bob cats. My impression is that the average bob cat is a n uncleanly animal, and will eat most anything that comes to hand. I have known them to dig into heaps of dressing to make a breakfast on ancient slaughter house offal, when in a pasture fifty rods away were a score of nice



THE BOB CAT

As a matter of fact the Bob Cat is the wild cat or Bay Lynx of the naturalists. There are several species of it in this country and Col. Roosevelt left us some excellent accounts of them. They have a characteristic short, stubby tail.

spring lambs that could be had for the catching."

This article was written at Brewer, Maine; Mr. Ford appears to be a very good observer of animals, and intelligently describes what he has seen.

There are some very excellent stories and pictures, the latter being reproductions of photographs from life in Colonel Theodore Roosevelt's article in Scribner's Magazine (October and November, 1901).

There is much about the wild or bob cat to remind us of the common domesticated animal, especially in some of its habits. Their way of hunting their prey is typically feline, and if one has the opportunity of seeing them at such times, it will be noted that their whole action is identical. A wild cat is a fine mouser, and there is no question that they kill and eat a great many of the

smaller species of birds. As in the case of the domestic cat, they glory in the pleasure a catnip bed brings them, taking great delight in rolling in the odoriferous plants until every part of their pelt smells strongly of them. They will also chew the young green leaves and the blossoms.

As a rule, a wild cat does not go abroad much in the day time; but like all its tribe, it prefers to hunt during the early hours of evening or even before sunrise. They "lay off," so to speak, during the middle of the day, resorting to some rocky ledge or the big limb of a tree, and do not object to the warm rays of the sun if they chance to shine upon them. This species is not essentially a forest animal; they seem to very much prefer to live upon the hillsides, where the heavy timber has been cleared away and been replaced by a second growth and a tangle of brambles partially concealing loose rocks and fallen logs. Through such places the wild cat goes noiselessly about, ready at any instant to pounce upon a rabbit, a squirrel or game bird that chances its way. Sometimes two wild cats will be seen together, but far oftener only a single one. As in the case of all our *Felidae*, they occasionally give vent to a most unearthly caterwaul—a howl that it is difficult to believe an animal of its size could be capable of producing; and if any of its regular game be in close proximity they will be certain to betray their presence in their fright, whereupon the cat takes advantage of their terror, and either immediately pounces upon the poor, startled creatures, or else cautiously stalks to the point from whence the rustling or noise proceeded.

Wild cats generally have a hard time of it in the winter; but they keep about during the entire season, however cold it may be, in spite of the difficulty to get through deep snows and to surprise and capture their game. Often, up in some big tree, the wild cat will sit for an hour or more, patiently watching a squirrel-hole until its inmate makes its appearance, when, with a lightning stroke the deadly paw will take him in; then follows a pitiful and frightened squeal, and the wily hunter has secured his meal.

The female generally produces from two to four kittens at a birth, dropping them in a nest she has prepared of moss and leaves, in some hollow log or recess in the rocks of convenient size and sufficiently secluded. They do not make good pets, it is said, and any attempt to tame or domesticate the captured old ones is never successful.

This species often gets away with the farmer's domestic fowls of all kinds, even the turkeys; they are also fond of eggs, and capture fish when they can, the wild cat being no mean swimmer. A writer at hand says: "It will follow flocks of wild turkeys, and, seeing in what direction they are going, will proceed by a short path to their probable destination, where it crouches down, and when one of them comes within its reach it bounds upon it and seizes it."

Generally, this species is very shy, and will resort to many tricks to elude both dogs and hunters, when hunt-

ed by them; and if ever cornered by the former, a wild cat can put up a fine fight. Years ago I knew of a fine setter dog that was killed by one of these cats, the latter having her kittens to defend at the time.

We may next pass to a brief life history of the Canada Lynx, a larger and heavier animal than the wild cat, and averaging some two inches more in length, the latter exceeding 38 inches. Many of their habits are almost identical, however, such as their methods of hunting, their untamable ferocity and their breeding. Flower remarked that "Various fabulous properties are attributed to the animal, whatever it was, by the ancients, that of extraordinary powers of vision, including the ability to see through opaque substances, being one; whence the epithet "lynx-eyed," which has survived to the present day, although having no foundation in fact."

Stone and Cram, in their "American Animals" (p. 287), introduce this particular cat thus: "The Canada lynx is a savage, flat-faced beast, with enormous muscular legs and paws out of all proportion to the size of its lean body and absurd *retrouse* tail. Its soft fur of clouded gray is so blended with various shades of pale buff and tawny as to be extremely difficult to distinguish in any light or against almost any background; even in the cruel publicity of a barred cage it is still indistinct, and one might well fancy the cage empty at a little distance."

When not alarmed, the Canada lynx prowls about among the underbrush and brambles in a perfectly noiseless and stealthy manner, hunting any mammal or bird that it has the strength and agility to overpower. If frightened or pursued, however, its action is entirely different, for it will make off in elegant leaps or bounds; and if hunters and dogs push it too hard, it will rush up the first available tree it comes to for safety. One of them will fight a whole pack of hounds for its life, and, everything being equal, will sometimes come out victorious.

As in the case of the Bay lynx, this species is a fair swimmer, and it is remarkable how one of them can, with safety, jump at an unusual height from a tree, and make off upon coming in contact with *terra firma*; it is said they sometimes capture their prey in this fashion. Owing to the great spread of the feet of this animal, it is able to get over the snow at a wonderful rate, and a hare or a squirrel stands but little show with it for a short distance.

During the winter when game often becomes very scarce, the Canada lynxes suffer severely from hunger, and at such times they will eat anything that happens to be eatable at all or comes their way. Lean and ravenous they prowl through the woods in the bitter, wintry blasts and heavy snows of the northern regions, once in a while giving vent to one of their blood-curdling yells, ready for anything from a fight to a freeze, but heartily wishing all the time for the warmer days of spring to put in an appearance.

The female breeds once a year, and then brings forth only two or three kittens—pretty little fellows, but

(Cont'd on page 659)

FOREST RECREATION DEPARTMENT

ARTHUR H. CARHART, EDITOR

THE UNWELCOME GUEST

A CERTAIN code of good social practice exists among all groups of out-door aristocracy. There is just as much good taste in the manner in which one may act in a party of campers as there is in how one may comport oneself at a dinner table. The high ranges of mountain systems have as exacting a system of how one should behave as has the best court of Europe. That system is not so elaborate and is nearer to true courtliness than is some of the pomp and show of a throne room, but infringement on good usage generally brings swift condemnation which is as complete and absolute as though the Lord High Chancellor had politely grasped your ear and lead you far from some kingly presence.

An illustration of how such infringement is greeted by people of the great woods or mountain lands will tell much. Ranger Earl Gilcrist (which of course is not his real name) and I had been tramping the timberline trails for three days in the hope of getting a deer during the brief open season. The night before we had slept in a delapidated prospector's cabin where the stove was in such bad condition that it was necessary to build a fire out of doors to cook on. The night before that had been spent at an altitude of 11,000 feet above the sea and

with a great fire roaring at our feet to keep away some of the chill of the October winds.

The days had been full of long hard hikes, of tense stalking of aspen thickets only to find them without game present and of climbing over ridges and along trails where few feet had passed before. On the day after the season closed, carrying a forty-pound pack each, we had climbed down from the high ridges and reached the base camp, a cabin, tired and disappointed at not bringing in a buck.

There had been two other men in the party, good fellows and city men. Instead of hitting the trails to the high country they had preferred to stay in the region near the cabin for there it was easier hunting and the chances of getting a deer were nearly as good as in the higher parks and timber.

When we came into the park where the cabin is located we could see that these other members of the party were gone. Earl evidently was thinking of something other than camp courtesy for he did not notice the potato peelings, tin cans and egg shells strewn on the ground in front of the cabin. Entering the cabin my gaze at once went to where a most serious breach of camp etiquette



TOURIST CAMPERS IN ONE OF THE NATIONAL FORESTS

There is often real pride evidenced in the camps of the old timer of the outdoors, and this fine, clean camp in a well-chosen spot marks the man who loves to camp and knows the ethics of camp life.



A DANDY PLACE FOR A MEAL WHEN "ON THE TRAIL"

Substantial tables or benches take no more material and little more effort to build than do the ramshackle kind. The next user will be benefitted too.

stood open to all eyes. Earl still dreamed and busied himself with getting some of his outfit together for the several miles that we still had to do with the packs on our backs. This done he sauntered over to the table that was side-board, work table, dining table and drying rack for washed dishes.

Then he saw what I had noted when first I looked inside the cabin. The breakfast dishes were not washed and the entire table was inexcusably dirty.

Ranger Earl exploded. There was a good lot he had to say about the situation and the men who had caused it that would not be good to print. There was no question what he thought of the act. He condemned it and it's perpetrators without equivocation.

In his milder moments he did say: "That settles it! Those fellows have lost a lot in my estimation. I had come to like both of them and thought they were real outdoor men, but this changes my mind. I'll never go on a trip with either again and I hope I never meet them in town. That grizzly hunt is off, too, and I hope they never come back to my district." And that was saying a great deal for those men had been good companions for several days and meetings in the city had been planned for the winter season and the first tracking snow was to have been the signal for the hunt of a cattle-killing grizzly that had roamed the sides of the mountains for many seasons.

The sad part of the whole incident is the fact that these men probably did not know that they were insulting the man of the hills when they left the cabin and dishes dirty. To them it was but a passing incident, to him it was as though he had been slapped in the face.

This case is not isolated. Time after time the traveling public as represented in the vacationists and tourists, well mannered enough in their own homes and in the

houses of friends, have heaped injury and almost insult on the heads of people who are ready to be their best friends if given any chance.

Would you enter a friend's house and help yourself to the use of his clothing and furniture or invite yourself to board there without being asked? It would have to be a very dear friend indeed who would overlook such a breach of manners. Yet the tourist traveling in a car invites himself into the front yard of some ranch, nonchalantly pitches his tent and helps himself to the wood the rancher has cut and piled for fuel during a hard winter. Would you have a kindly feeling for someone who would come into your doorway and cut up your fence posts for fuel to build a campfire? Some people do this very thing on farms near where they camp a night while touring and then express the greatest amazement because the farmer-owner gets angry. Would you invite J. Baxter Trudelsley and his family over into a friend's garden to eat watermelon and then toss the rinds

into the neatly graveled paths and flower beds? Travel any road in the West where tourists congregate and it will not take long to find a place where watermelon rinds or other camp refuse clutters up a parking along a road or creates a mess on some otherwise delightful picnic spot.

In all of the great family of outdoor and forest people



INSURING THE NEXT VISITOR A PLEASANT PROSPECT

One of the most common habits of the bad camper is to leave all wrappings around food, old newspapers, etc., on the picnic spot.

who constitute the family of American Forestry readers there are probably few if any thoughtless ones who overstep outdoor etiquette at any time. For where true love of nature is present in a person he will be a clean camper and a good sport on the trail or trip. But any of you may have friends and acquaintances who are not so well bred when under the sky. You may know of some one who steps over the line of propriety of the outdoors or there may be some time when you see another otherwise good citizen committing the petty crime of leaving a dirty camp. This article is the result of a long summer seeing this petty vandalism and unconscious violation of camp and trail social customs and is directed to all people who go afield so if they do not violate any rules themselves they may become militant against the ones who are spoiling the opportunities for the real sportsman.

Not a month since a rancher was discussing the fact



A FINE, CLEAN CAMP ON THE EDGE OF THE RIVER

This is a close-up of a fisherman's camp near Windy Gap. A clean camp is a pleasant place to live and is not difficult to maintain.

that in a certain valley where trout abound in willow-shaded streams every farm has a sign on the gates and many fences telling people to keep out. Two years ago this valley welcomed all fishermen. They were guests. They came and did not act as guests but as petty conquerors and the farmers who really ruled their own farms then as now, today resist invasion.

If fishermen are barred from entering on these farms in pursuit of the hard-fighting rainbow it is their own fault. This rancher told of people who had come to his place and without asking leave camped on the front lawn and when leaving neglected to take with them sundry tin cans and papers which they had strewn over the grassy yard. Another party romped merrily in a hay field never thinking that in so doing they were causing a loss in hay and money to the farmer. Other campers had helped themselves to hay from stacks near the road to make beds. Each act in itself may have been thoughtless on the part of the actor, but the aggregate of all has caused these farmers of the valley to despise tourist visitors that two years ago were welcomed. So now signs on gate and fence warn these visitors against trespassing.

These acts enumerated are some of the more flagrant and one will readily think that any person with any good grace at all would not wilfully commit them. But they have all happened in this one small valley and the tourist has worn out his welcome.

Did you ever see a person go through a gate and leave it open? A small thing in itself to shut that gate when passing through. I am sure you have noticed some one do this little act or you may be guilty yourself. Maybe the only time you ever committed this breach of good outdoor practice by leaving a gate open it took the



A STOP FOR LUNCH

Being a good camper is easy if one thinks of the other fellow. This visitor will leave a clean camp, and the fellow before him thought of the next man when he carefully laid aside the tepee poles seen in the background.



THE LATCH-STRING IS NOT OUT TO THE TOURIST HERE

This is a case where the owner is apparently unfriendly to campers—indicated by the two signs and the long notice posted on the padlocked gate. Such a situation often exists as a result of the continued carelessness of campers, who might otherwise be made most welcome.

owner of the place a half a day to round up his stock. Or it may be that he lost a valuable horse because of it. Now, soberly speaking, is such an act worthy of anyone who loves the outdoors?

Do you or your neighbor picnic in the woods? Everyone loves to eat a meal in a cozy little park-like space in the timber. But did you or your neighbor leave a clean camp? Well, that is another question. Often, very often, a picnic party using a picnic grounds wears it out with the one visitation. Cans, string, egg shells, banana peelings and paper plates litter the whole outlook and one who comes later finds that his predecessor has dissipated the beauty which beckoned to stop and there lunch.

The jitney tourist is not the single malefactor. Men who drive high-powered cars often show the most despicable traits when trampling on the courtesy of the outdoors. By a campfire that crackled far in the depths of a western forest three men talked of another man of their set who was not there and they breathed fervent prayer that he would not come for he was unwelcome.

One of these men came of a family of New York financiers and his name is a power

in the money market. A second had made several fortunes in oil and one or two in steel. The third had hunted lion in Africa and invaded Bolsheviki Russia with the American Red Cross. His name is known internationally as that of an experienced explorer and hunter. Many campfire tales were told of hunts and hunting, but never a night went by when these men, leaders in their own industries and in sport and then at the campfire, a part of the group of good fellows who may be found in many a camp, did not softly or stridently condemn the absent one who was of their clubs, society and business planes, but was not a gentleman out of doors.

There is a real serious phase to this problem. It affects everyone who travels in the open country. Carelessness on the part of a few affects all for the local resident does not discriminate between the classes of traveler-visitor. They are all tourists and if he has become convinced that all tourists are bad through the acts of some petty vandal it will take many associations with the gentle folk of the road to change his mind. He is not going to risk one act of wilful vandalism in order that he may be host of many people who will be good guests.



REFUSE LEFT BY CARELESS CAMPERS

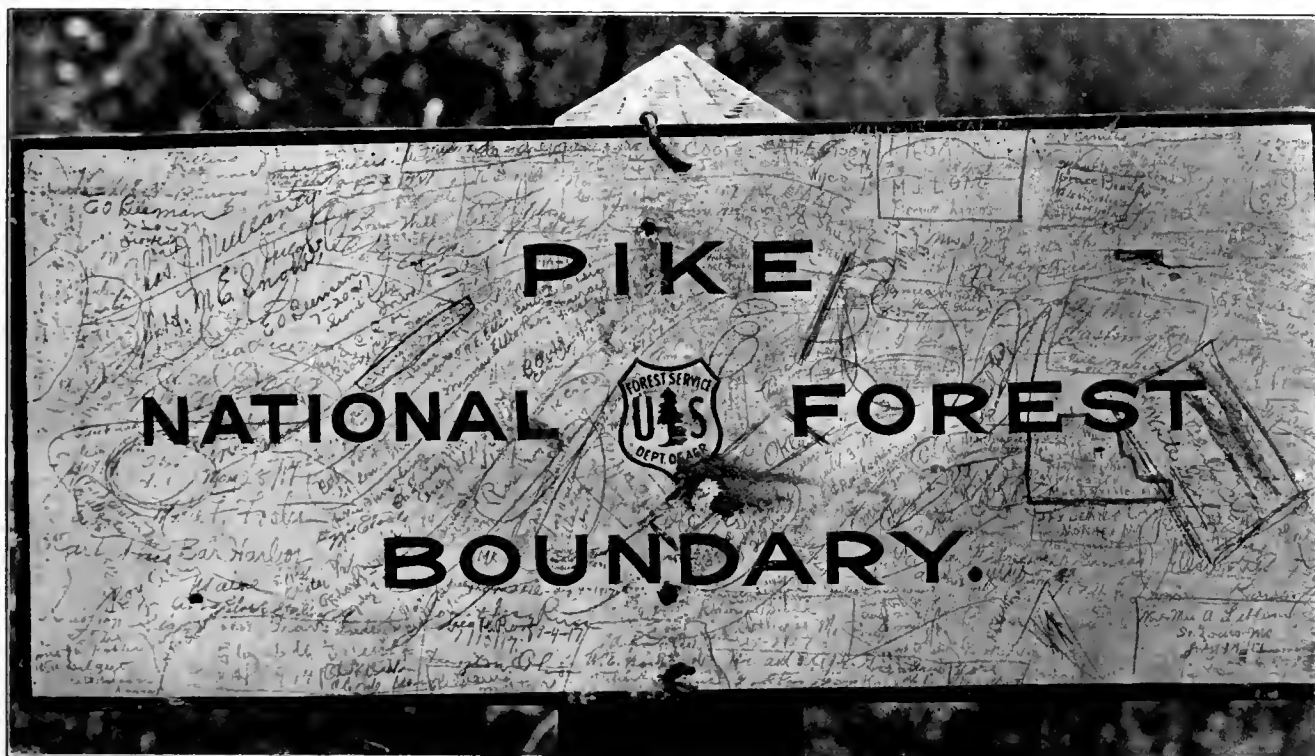
Once a cozy little nook, near a picnic spot, the most enthusiastic optimist could not call it pleasing now. Such a sight is as distressing to a good camper as a littered backyard to a good householder.

Two years ago the valley where, in many streams and pools lurked the rainbow, welcomed tourist visitors and the ranches were not posted. Today there is not a farm left where the fisherman is welcome. Not all committed depredations. The percent is very small. And yet the farmer posts his land to protect himself from those few who become rowdies when in the open, although they may be very models of precise social practice in their own homes and homes of friends.

There seems to be no element of pride in being a good picnicker so far as some people are concerned. If they can get away with it they will leave camp sites filthy beyond description. Even the most refined people do this and are often the worst violators. The question naturally comes sometimes, is culture only a veneer or does the

wilds for the first time that leaves his camp in filthy condition. It is the townsman going afield in his flivver who tramps the hay in the meadow and leaves gates open where valuable stock may be lost and time spent in hunting strayed cattle follows.

And hundreds of thousands and millions of these people who until recently have never visited a place out of the sound of a trolley are now annually taking entire vacations on the road gypsy fashion but with a car instead of a horse-drawn wagon. If these people are to be welcome they must learn the etiquette of the camp and the road. If the fields are to be open to people coming to fish for trout every member of the tourist class, of every station of the brotherhood of the highway, must observe simple customs established as the social law of



A GOOD EXAMPLE OF AN ALMOST IRREPRESSIBLE DESIRE OF THE AVERAGE TOURIST

One petty vandal with which the Forest Service has to deal is the fellow who insists that the world know he has passed that way. He will scribble his name and often his place of abode on any sign large enough to take it.

refinement of the drawing room not fit the picnic places? Is there the same basic reason for good manners in the field there is in the club or home or does the out of doors lack some refining influence that is possessed by man-made institutions?

No, because there exists today a code of conduct in the woods. To those who have lived there it is an open book. It is as exact as any social usage of the society groups found in towns and cities. Fundamentally the golden rule is the basis of all social law of the hills. Inherent gentle breeding will take one far in the company of the woods people and of those who ride the high range or with the companions who may be in the party. It is the person new to the outdoors who violates the simple rules of good conduct in the open. It is the city man invading the plains and hills.

The sorriest feature is not in the righteous ire of the one sinned against towards thoughtless novice who oversteps due bounds but the reaction of the man of the hills against the whole class of tourists. Self protection dictates that this newcomer to the family of the outdoor people be taught the code of the fraternity.

The code exists. It is simple but it is strict. Simple inherent graciousness will carry one in the respect of all outdoor people until the code is learned and the golden rule is a safe test to apply to any act that may be done or not done which will affect those people with whom you come in contact on the highway, in the field or in camp.

All users of the outdoors are today on trial. They have been wholly condemned by many who have suffered

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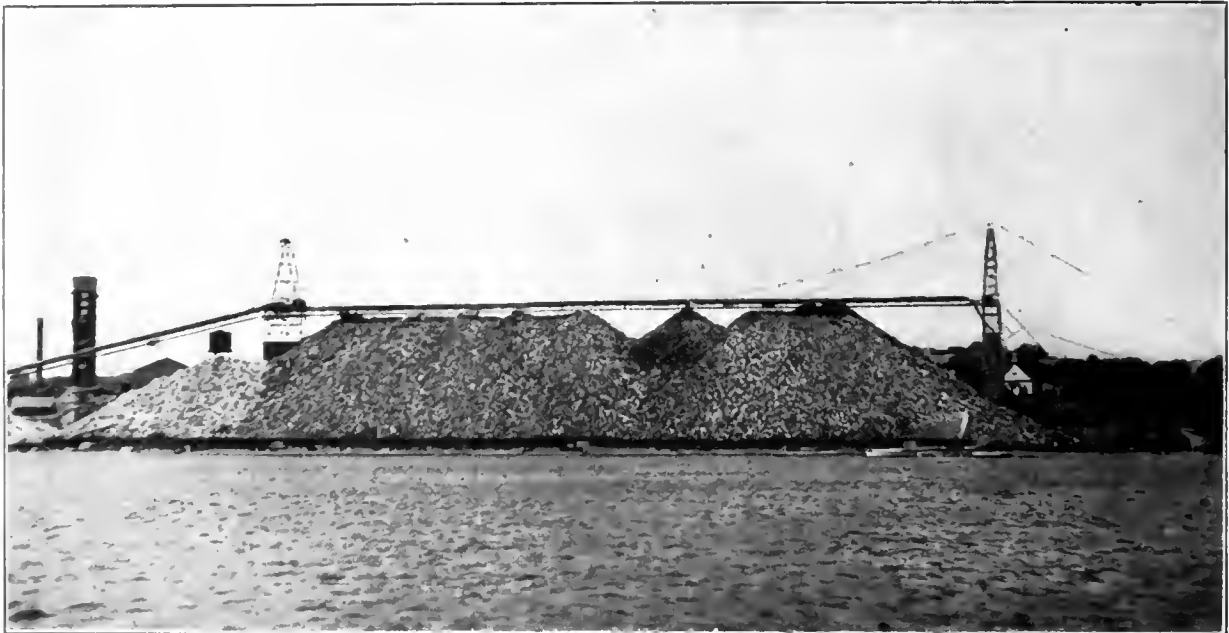
PHILANTHROPY OR EFFICIENCY

BY ARTHUR NEWTON PACK

ALL too often forestry is regarded solely as a philanthropic scheme which begins and ends with planting trees, an appeal to our sentiment which permits us to write down our contributions in our account books or our consciences with a considerable feeling of moral satisfaction. Unfortunately this impression is shared even by some of the business heads of our lumber and wood-using industries, and as it is undoubtedly true that a good many thoroughly impractical ideas have been given out under the name of forestry, perhaps the business man, whose creed must necessarily be based on Results, is not wholly to blame for his attitude. All the talk of the newspapers and periodicals of the country about a timber shortage is not likely to influence the lumberman who has

Practical forestry neither begins nor ends with any such attitude; it is essentially the efficiency engineering of the wood-using industries, and until both foresters and managers fully appreciate this viewpoint there can be little progress in the industrial application of forestry principles.

Some of the largest newsprint manufacturing concerns in Canada are now pioneering in the practical application of forest engineering. It already seems likely that several others will follow the new lead. There will be some who say that it is a mistake or even a heresy to confuse forest engineering with forestry, because forest engineering is essentially the application of engineering study to the problems of cutting, log-hauling, and delivery to the mill,



NEWSPAPERS ARE MADE FROM THIS

Piles of pulpwood at a pulp mill ready to go to the paper mill and be made into great rolls of newsprint of which we use two million tons a year in our newspapers.

in sight for his own mill a supply of timber which he deems sufficient to pay a fair profit and amortize his mill and investment, unless he realizes that the application of forestry methods will not so greatly diminish that earning power upon which he must count, that the future saving will not be worth while. If he smiles at the talk of scientific cutting and treating timber as a successively maturing crop, it is only because he can see nothing but the expense of adopting the new methods.

Now that the great wood-using industries everywhere, and particularly the pulp and paper companies, are hiring foresters and building nurseries for raising tree seedlings, he may find it wise not to appear less progressive; but a forestry department organized without a definite or practical policy is from the beginning classed as a purely philanthropic side line, and as such is forever handicapped.

and they believe it is simply scientific forest destruction. The more modern viewpoint, which emanates from a group of American and Canadian foresters, is that the practical forester is so much the more able to handle his special problems of reproduction of timber, if he understands its present as well as its future connection with the dollars and cents of business. These men have studied the woods as actual members of the logging crews, seen at first hand the shortcomings of obsolete systems, and by the demonstration of their ability to show where real economies can be introduced, are winning the confidence of their directors to the broader application of forest conservation. They have determined to stamp out the old philanthropy idea.

In eastern Canada, Maine, and part of New Hampshire and New York, pulp wood is brought to the mills

by much the same methods of winter cutting and spring driving of the rivers as was made famous in Stewart Edward White's stories of the old Michigan days. The company itself operates a certain number of camps under its direct management and control, but usually a considerable quantity of the timber is "contracted". While it was generally realized that the contract system resulted in only the best timber being taken and the remainder being left in scattered bunches which would not permit of a second cut except at prohibitive cost, it has remained for the new type of forest engineer to demonstrate the really awful and destructive waste therefrom. It is the forest engineer who has now produced figures to show that pre-planning and careful preliminary reconnaissance and mapping, even at considerable expense, will not only extend the life of the operation but also bring logs to the mill at a less cost per cord.

While old school logging bosses used to laugh at forestry ideas, it is now the forestry department, made up of a personnel of forest engineers, which, for these pioneering companies above mentioned, becomes the planning and control department for the woods operations. At the beginning of the season the chief forester is in conference informed as to just how many cords of wood and of what proportionate species will be required for the coming year. With the aid of more complete maps than were ever before thought necessary, some of them made perhaps with the aid of aerial photography, the forestry department selects the areas to be cut. Experienced engineers are sent to blaze out the roads which will have to be built, and locate the camp sites. Then when the cutting begins a regular inspection is carried on to see that company camps and contractors alike abide by the directions given. Progress reports, hitherto almost un-

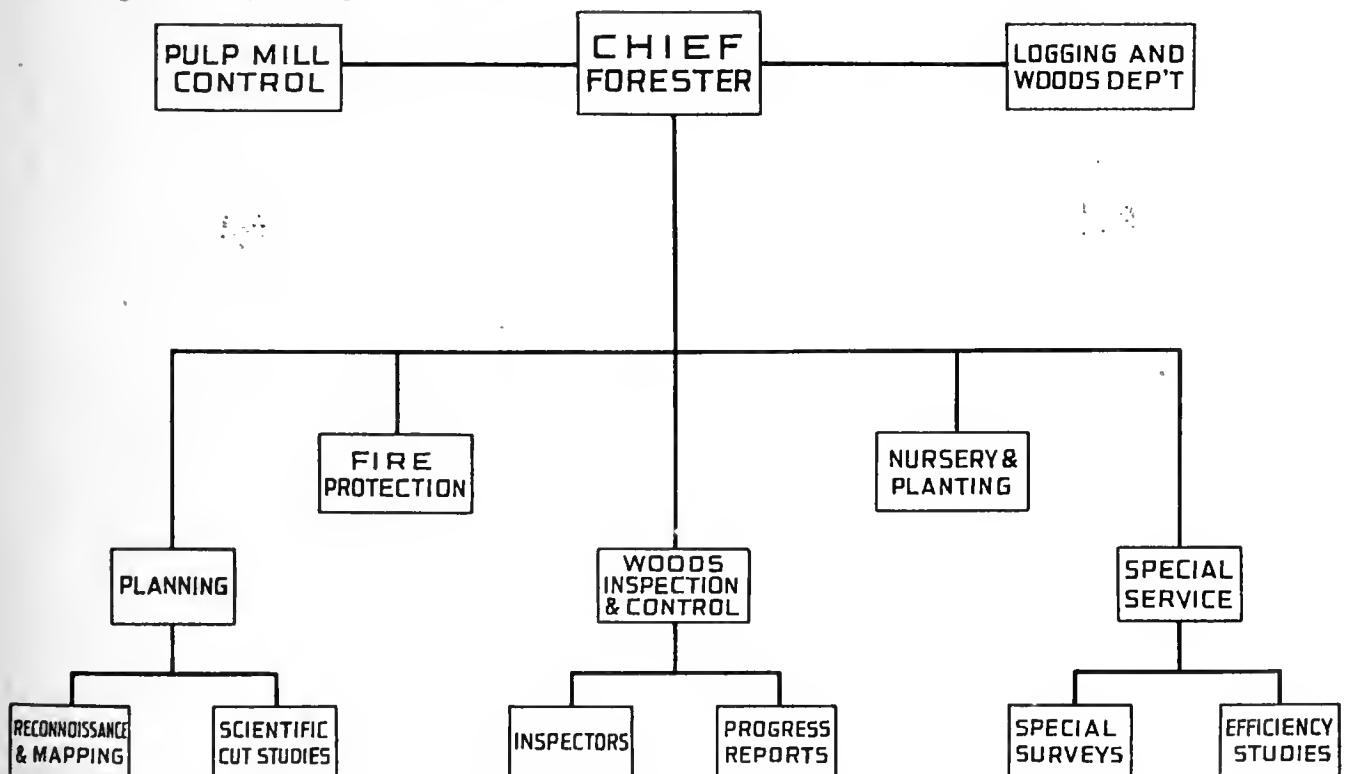
known in the logging industry, keep the mill management informed as to the expectancy of raw material. Meanwhile a separate branch of the forestry department is carrying on special surveys for bridge or dam sites, making time studies of towing operations to determine fuel and labor costs per unit of production, or conducting experiments with some new equipment. Cost systems have been little applied to woods operations. Some of these foresters even hope to demonstrate that such study will prove quite as valuable to a large scale logging operation as to a cash-register or automobile manufacturer.

In all this fire protection will not be forgotten. The closer touch between forester and woods operations alone should make such protection more easy of attainment. Nor will the operation of a nursery be made less valuable, for the forestry department with its finger on the pulse of the whole woods operation can better lay out areas to be replanted.

Economy in operation is true conservation. It is for the forester as forest engineer to show real economies, for then with faith in his practical abilities and through the actual savings thus obtained, can be made those very necessary experiments in scientific cutting for natural reproduction which may in time here in America, as well as in Europe, prove the real basis of a perpetual timber supply. There lies the crux of the whole problem and the justification of the forester as forest engineer.

The new forestry and engineering department is certainly in a far better practical position for carrying on experiments in selective or strip cutting, than as a supplementary philanthropic hanger-on. And experimentation is what we need, for our Canadian and American

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SUGGESTION FOR ORGANIZATION OF INDUSTRIAL FORESTRY DEPARTMENT

THE TREE

By GRACE CLEMENTINE HOWES

This is the tree--from the earth's warm
breast it grew,
Called, called of God.
Piercing the loam, a frail, twin-leafed stem,
it drew
Strength from the sod,
And manna from wilderness sunlight and
dew
In ways untrod.

God wrought it wide branches, tuned to
wind-music,
Like a harp's strings,
Boughs fashioned for beauty, for bird-song
and nestings,
Upspringing like wings,
And wove it a robe and a crown of green
leaves
For its burgeoning.

O sun-tipped wings that fan the sweet air
all day!
Wings that aspire,
Straining your earth-roots, lifting you
heaven-ward
Higher and higher,
Curved as in prayer, upraised on the even-
ing sky,
Star-edged with fire.

O branches that tossed in the valleys and
hills
Over league-long miles!
Now, here, like peace-folded wings you
arch high o'er
The cathedral aisles,
Or there, curving tenderly, cradle the babe
Where he dreams and smiles.

You are dumb, silent witnesses shelter-
ing
Many a home,
And you bear the white sails of the seven
seas
Through the flying foam,
Dipping sunward where strange, distant
havens lift
Palm-leaf and dome.

As ships you build worlds--'twas you were
that great ship
Of Destiny,
That bore to new lands, our fore-fathers,
Pilgrims
Of Liberty,
On, straining on toward the goal invincibly
Through a strange sea.

You were their shelter, their defense and
their strength,
Thus you became
The live, fragrant sacrifice kindling a
nation's
First hearth-flame,
And wrote on our history's scroll, and our
hearts,
Your deathless name.

Since when, you are sacred, symbol of great
souls,
Souls that aspire;
Your wings sweep the sky o'er the dying
day's
Vast funeral pyre,
Lifting, reaching up from the last-red
embers
Your pure desire.

EDITORIAL DEPARTMENT

A NEW MENACE TO FORESTRY

BY HENRY S. GRAVES, FORMER CHIEF FORESTER

THE foresters of the country and the friends of the forestry movement are watching with interest and anxiety the proposals for the reorganization of the Government departments, especially as these proposals relate to the Forest Service. This is not merely a matter of academic interest, for the manner in which the work of the Government is organized and conducted will have a far-reaching influence on the policies applied in the National Forests and on the effectiveness of the general forestry movement as led by the Government. A change in the form of the federal organization, and especially one that dismembers the Forest Service or divides the responsibility of its work, will inevitably impair the effectiveness of the national undertaking and perhaps set back the progress of forestry throughout the country for many years. Certainly any change that would result in altering the present broad objectives, policy, and point of view in forestry would be a serious blow to the whole movement.

The federal forest work is now centralized in a single bureau, the Forest Service. This organization is charged with the administration of the National Forests, with leadership in bringing about forestry in the States and on the property of private timberland owners and farmers, with research in forestry as it pertains to the problems of production and utilization of timber, and with general educational work in forestry. Excellent progress has been made in forestry for two reasons; first, because the functions of the Government have been centralized in one responsible organization, and second, because the Forest Service is now in a Department specially qualified on account of its natural functions and point of view, to supervise its work. There is now distinct danger that the Forest Service will be taken from the Department of Agriculture and placed where by nature of things a different point of view exists; and there is danger also of actual dismemberment of the Forest Service and of dividing the responsibility of the federal work in forestry among two or more organizations. The possibility of such action is of vital concern to every person interested in the progress of the forestry movement; it is of personal concern to the lumbermen, stock men, ranchers, farmers, miners and others who live adjacent to the National Forests and whose permanent welfare is affected by the manner in which the public resources are administered.

The Administration has not disclosed its definite plans. Many hints, however, have found their way into the press that suggest that a radical change affecting the Forest Service is in contemplation. It will be recalled that for several years the Engineering Council, representing the organized engineers of the country, has been advocating the creation of a Department of Public Works. This proposal has many admirable features, although the specific suggestions have, in my opinion, certain defects. Among other things the proposal includes the transfer of the Forest Service to the new department, under the allegation that its work is primarily of an engineering character.

Recent articles in the press indicate that this plan has the support of the National Budget Committee of New York and of various other agencies interested in Governmental reorganization; and the newspapers also indicate that some plan of this sort is being considered by the Administration. The theory appears to be that the Department of the Interior, whether under its present name or that of Public Works, should have two main functions, first, the work of an engineering character that might be included under the general term Public Works, and second, the administration of the public domain. Apparently the idea is to absorb the Forest Service in this new Department, with its administrative functions on the National Forests classed partly as engineering and partly as public domain. In case of such a transfer, the functions of the Forest Service would probably be divided among several bureaus rather than be centralized as at present. While the published proposals do not indicate what would be done with the technological and industrial research in forest products now conducted at the Madison Laboratory, rumor in Washington has it that this would be severed from the Forest Service entirely and transferred to the Department of Commerce.

* * *

Formerly the forestry work of the Government was divided. The Agricultural Department handled the problems of forest production; the Interior Department had the administration of the public forests. The plan was a failure. The public forests were not administered efficiently, and the efforts to utilize the technical corps of foresters in the Agricultural Department in cooperation with the Interior Department broke down. It was only when the handling of the public forests was made a function of the Agricultural Department, as part of the broad responsibilities of the Government in forestry, that efficiency was secured and a forward looking policy developed. Then the handling of the National Forests was made successful and the new policy has been cordially accepted by the people of the West, where most of the public forests are located.

The responsibilities of the Federal Government in forestry are not merely confined to the administration of the National Forests. In fact, these public properties comprise only about twenty-three per cent of the forests of the country. The functions of the Forest Service include the leadership in bringing about the proper handling of all of the forests of the country. In accomplishing this the National Forests must play a large part, both through the example of good forest administration and through cooperation with States and private owners by the organization which is actually and successfully applying forestry on the public property.

Among the reasons why the Forest Service should remain in the Department of Agriculture are the following:

1. The task of forestry is so intimately related to the agricultural development of the country that it cannot be successfully worked out as an undertaking separate from

agriculture. In the long run, fully sixty per cent of the forests of the country will be in relatively small holdings and must be developed in correlation with the intermingled farm lands. Many of these small holdings will be owned by farmers and be managed as a part of their farm enterprise. The Government work that has to do with this class of lands will have to be administered by the Department of Agriculture. This Department would require a corps of men and an efficient organization of its own, even if there were a separate bureau of forestry in another department. We would immediately have the sort of duplication that is today so seriously criticized, and we would have a much less efficient handling of the work than would be the case under a single organization responsible for all of the forest work of the Government.

* * *

2. While the National Forests render a national service through the protection of interstate rivers and through the conservation of a supply of timber for the future, the first benefits of this public enterprise are to the communities, industries and individuals located in their vicinity. In point of numbers the majority of the users of the National Forests are small ranch men. The most conspicuous results that have been obtained from the National Forests have been through their influence in stabilizing and building up on a permanent basis hundreds of rural communities within and near them. Their influence in strengthening a prosperous rural civilization cannot be overestimated. The fact that the Forest Service has had this conception, which is also that of the Department of Agriculture in its other work, explains the success of the undertaking.

* * *

3. The two greatest tasks in the administration of the National Forests are first, the production and use of trees, and second, the production and use of forage. Both of these problems require technical administration, that is, an administration based upon the knowledge of plant life and growth. The primary service of the Forests is through the trees upon these public properties. However, there is a large amount of excellent range which is being utilized by live stock without injury to the forest growth. A system of grazing administration has been built up that is based on a technical knowledge of forage production and conservation. This in itself is an agricultural problem; it could not have been solved except through agricultural experts. The handling of the National Forests is not a function similar to that of the administration of the unreserved public lands. The Administration of the public domain has been throughout our history primarily one of disposing of lands to private individuals through the general land laws. It has not been a problem of utilizing lands held under permanent ownership by the Government and applying to them the principles of crop production, as is being done with the timber and grass in the National Forests.

Nor is the administration of the National Forests primarily an engineering enterprise. There are many engineering features in the handling of any land project.

The major work of building roads is now handled by the Bureau of Public Roads and the Forest Service has not built up an independent corps of engineers. Under the widest interpretation not over twenty-two per cent of the appropriations for the Forest Service are spent for engineering work. If we leave out of consideration the money for road building which is expended on behalf of the Forest Service by another bureau, the sort of engineering work conducted on the public forests is analogous to that of any organized agricultural enterprise.

* * *

4. It has been suggested that the Forest Service should be in the Department of the Interior, because of the large number of questions of land titles and similar matters in which the General Land Office has a part. In point of fact, there is no more need that the Forest Service should be in the same Department as the General Land Office than that it should be in the Department of Justice where constantly there are many cases of litigation which must be handled by the Attorney General. On the other hand, it is of vital importance for the Forest Service to be in close relationship with the Bureau of Animal Industry in connection with problems of live stock; with the Bureau of Plant Industry, which has experts studying the diseases of trees, questions of plants poisonous to live stock, problems of forage production, etc.; with the Bureau of Entomology, whose experts are studying injurious insects and methods of combating them; with the Bureau of Biological Survey, which cooperates with the Forest Service in protecting the wild life in the forests, in exterminating prairie dogs and other animals destructive of useful plant life, and in the reduction of wolves, coyotes and other predatory animals that prey on live stock and useful game; and with the Bureau of Public Roads, whose engineers supervise the construction of the many road projects in the National Forests. In a sense the whole organization of the Department of Agriculture is participating in the work of the administration of the National Forests. A great loss would be suffered by interrupting such a successful organization of effort.

* * *

5. In its work of extending the application of forestry to private lands the Forest Service works in part through direct educational means and in part through cooperation with agencies of the different States and with private owners. Where the work touches agricultural communities the Forest Service utilizes to a large extent the existing cooperative organization of the Department of Agriculture. The transfer of the Forest Service to another Department would enormously complicate such cooperation, if it did not practically put a stop to it.

* * *

6. Finally the research work in forestry is very closely related to other research in the Department of Agriculture. The studies in tree growth, forest production, natural reproduction, tree planting, and the like are studies of plant life. This is a distinctive field of the Department of Agriculture. The same is true also of the technological studies now conducted at the Madison Laboratory.

The wood technologist studies how to utilize wood more efficiently. His problem is not one merely of testing standard materials. The qualities of wood are very closely related to the manner in which the trees grow, to their age, their location, their varietal differences, etc. The methods of handling wood, the changes in grades, the utilization of lower grades in place of the higher classes that are becoming exhausted, are problems that cannot be separated from the forest itself. And the same thing is true of those industrial studies that do not pertain primarily to statistics of prices, stocks, and distribution of lumber. The Forest Service has been successful in these studies because of its knowledge of the forest. They are essential not only in the handling of the public forests, but also in the work of extending the practice of forestry to privately owned land. They bear the same relation to the application of forestry as the studies being made by the Department in farm economics bear to the building up of agriculture. The separation of the Madison Laboratory from the Forest Service would be as disastrous as separating from it the silvicultural investigations.

* * *

The foregoing are specific reasons, and they might be expanded indefinitely, against the proposed transfer. Underlying the whole matter, however, is the question of the point of view and of the objectives in handling the forest problems of the Government. In each department of the Government there is a characteristic point of view in regard to public problems. Thus in the Department of Commerce the chief interest will always be centered on commerce and industry. If that department should take over the Forest Service there would be a tendency to approach the forest problems from the standpoint of lumber production and of other industrial questions, rather than from that of constructive land utilization and the building up of our rural life. It is not a derogation of the War Department to say that if the Forest Service were under its supervision a military point of view might dominate the policies of handling the National Forests in the long run. The same principle holds good for the Interior Department. Its attitude towards the public lands is the result of a century of disposing of the public domain. It is well known that this department has not been in sympathy with the enlargement of the National Forests or with many of the policies of the Forest Service. It has favored a wider application to the public forests of the old principles of handling the public domain. Certainly the expressed attitude of the present Secretary of the Interior in many matters relating to the resources of the National Forests is far from reassuring to the public, in considering any plan by which these properties might be placed in his charge.

The suggestion is now made that under the proposed reorganization the point of view of the engineer would be dominant in the Interior Department. What is essential in forestry is the point of view of the forester, the agricultural economist, and rural organizer, and not of the engineer. Again it is a question of point of view as well as

of technical knowledge. In this respect the problem of forestry may be as foreign to the experience of the engineer as of the public-land lawyer. Even if technical questions are left out of consideration, the danger of introducing a new point of view in land classification of the public forests, in the grazing administration, and perhaps in the character of the personnel of the Service, would be very great.

The Forest Service has succeeded after many years in establishing stable and consistent policies and methods in handling the National Forests. These are understood and accepted by the great mass of people using the Forests. Any radical change in the organization of the Service would inevitably mean changes of policy. It would reopen many vexatious questions that have been satisfactorily settled. It would have a serious effect on the success and permanence of the whole National Forest Policy. This in turn would have its effect on the forestry movement throughout the country.

* * *

The service of public forests to the Nation depends on keeping their administration entirely free from politics. The Forest Service is a large organization and its members are scattered widely throughout the country. Individual forest officers have large responsibilities in handling the various resources on the Forests, in the disposal of timber, in the employment of labor for various purposes, and in the allotment of privileges for the grazing of live stock, for the free use of timber and for other purposes. It is essential that the forest officers be men of integrity; they must be men wholly uninfluenced by any considerations other than impartial justice and a spirit of public service. It is easy to conceive that a large organization of men whose work affects so many people in a material way could have a powerful political influence, if the element of politics were injected into the administration. It is perfectly clear that if politics were a factor at all, there would be a grave danger of favoritism, of the appointment of inefficient men, and a let down in standards of work. The result would inevitably be the undermining of public confidence and ultimately the break down of the whole system. Fortunately the Department of Agriculture is free from political considerations in its personnel and work. When the public forests were under the Interior Department the entire personnel was political and the administration notoriously inefficient. Theoretically the question of politics ought not to be a consideration in the present problem. Unfortunately the question counts in a very big way and it has an important bearing upon the proposed transfer of the Forest Service from the Department of Agriculture.

It is imperative from the standpoint of the success of the forestry movement and the service of the National Forests to the country that the Forest Service be retained in the Department of Agriculture where it is free from politics, where it has already won wide public confidence, and where it is in a position to go forward with stable policies that have been approved by the country at large.

TREES WITH BRIGHT AUTUMN FOLIAGE

BY F. L. MULFORD

THE autumn landscape may be made as attractive as the spring landscape if the plantings are made with this object in view. About the home attention should be given to planting for this season along with that for other seasons, as the average home is occupied for twelve months in the year. Of course, there are homes that are deserted for long periods and the planting about these should be such that they are most attractive at the season when they are occupied. With other homes there may be special reasons why the plantings for certain seasons should be emphasized at the expense of those for other times. For example the surroundings of the home of a college president or of a college professor might appropriately be planted to be most attractive in the spring especially just before Commencement, so that it might be used in connection with social functions at that season of the year, and specially attractive features for other seasons might be sacrificed to this end. While

it might be appropriate to devote the president's grounds or even a small portion of the campus almost exclusively to a spring garden, on the other hand a college or boarding school campus should be so planted that the best possible effect should be produced at the time of the opening of the college and for the succeeding weeks even at the expense of the spring effect. With the average school, planting for summer effect may be ignored, while for a summer home or in a summer resort special effort for attractive conditions at this season would be most appropriate.

Because flowers are scarce in the fall many people have not thought of the possibility of making their home surroundings especially attractive at this season of the year. It can be accomplished however, even on quite small places by using appropriate plants. People who can afford to travel to and fro at will, often go to the mountains to enjoy the brilliant coloring of the autumn



SUGAR MAPLES

These specimens have grown in a forest so their trunks are very much longer than they would have been had they spent their life in the open, but their fall color will be just as bright a yellow and they will be as attractive in the landscape.

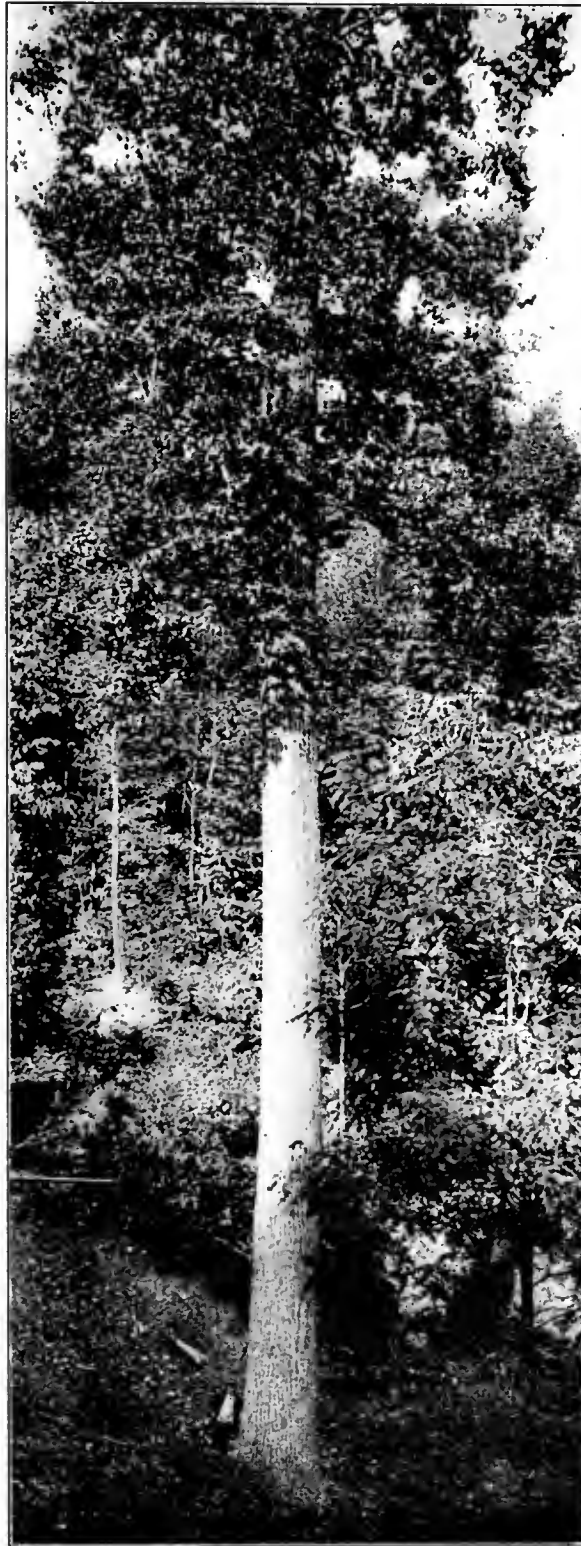
foliage. These same brilliant colors may be brought into the home grounds with wonderful results. Of course on the small place there cannot be the same magnificent mass effect that may be enjoyed where whole mountains of color may be seen at once. On the other hand, the details are lost in the distance in the case of the mountains but on the home grounds they may be observed and enjoyed. In many of nature's works what may be enjoyed at a distance in bold masses may also be enjoyed close at hand where the exquisite detail may be appreciated. Man may construct either for close or distant view, but seldom succeeds in combining in the same object pleasing results from both standpoints. Fortunately the plants that give the great masses of autumn color in the forest are also beautiful when viewed as individuals close at hand.

The contrast in the greens of the American landscape as seen in spring and summer is apt to be somewhat dimmed in the fall as the result of the dry weather prevalent in so many sections of the country at this season of the year. This dulling of the general effect may make the later changing of color to brilliant reds and yellows all the more noticeable. It is upon these foliage changes that the planter must largely depend for the late autumn effects. Earlier in the season flowers can be utilized. Some of them are golden rods and asters with iron-weed, Joe-pye-weed and rudbeckias, including the showy golden glow; while in shrubs there are the fading trusses of the hydrangeas, especially the hardy garden hydrangea (*Hydrangea paniculata grandiflora*) and the flowers and seed of the climbing Japanese clematis (*Clematis paniculata*). At this season, too, many of the showy berries are beginning

to color well, but they do not reveal their most striking beauty until the foliage is gone. It is after the leaves have dropped that the beauty of the berries and of bright-colored stems are seen to best advantage and not until after the snow comes that they are most appreciated.

In winter, too, evergreens add a welcome bit of color if used in moderation, the coniferous evergreens in the north like the pines, spruces and cedars, or broad-leaved evergreens in the south, like the evergreen magnolia, the hollies, and the cherry laurel. But it is not alone in winter that the dark green foliage of these trees is of advantage in the landscape, for they greatly enhance the attractiveness of the changing foliage of maples and oaks on the approach of cold weather. Bright red or yellow leaves become much more attractive if seen in contrast with the dark green foliage of evergreens.

One of the first of the good shade trees to show bright color in the foliage is the red maple (*Acer rubrum*) also sometimes called swamp maple. This becomes a rather large tree of somewhat irregular shape when mature, bearing smallish leaves of the typical maple shape and of a rather light green. Small branches or whole limbs often begin to turn a beautiful red and yellow as early as August. These splotches of color often remain for weeks on otherwise green trees. Sometimes it is a few scarlet leaves, again some yellow ones, but more often red with more or less admixture of yellow. As the season advances the whole tree assumes these bright colors, the different branches assuming different shades and combinations. It drops its leaves earlier than many other trees, but it is one of our handsomest. In addition



A FOREST CAPABLE OF BRILLIANT COLOR EFFECTS ON THE APPROACH OF WINTER

In such a forest the red and yellow of the red maple on the lower reaches may be supplemented higher up by the red of oaks interspersed with sugar maples and tulip trees like the fine specimen in the foreground.

to its striking fall appearance, in early spring it assumes a bright red from the opening flowers and leaves and continues an object of special attraction for nearly or quite three weeks, until the keys or seeds are ripe. It is native to low ground and also close to the ocean, but thrives on high ground. It is distributed over all the eastern half of the United States and is useful except in the semi-arid and sub-tropical parts of the country.

A worthy companion of the red maple for fall effects is the red oak (*Quercus rubra*) that forms tall oval-headed symmetrical trees whose dark green foliage gradually turns a deep red late in the season. Ordinarily the turning leaves hold on for two or three weeks and their rich dark red makes a magnificent show, especially if contrasted with yellow foliaged trees. If planted with evergreens other and brighter colored trees should be used with them. Their coloring is magnificent, but needs the yellows to give it its true value in the land-

is the sweet gum (*Liquidambar styraciflua*). The leaves turn a brilliant scarlet with more or less yellow as a sub-color, but giving the impression of a bright scarlet at a little distance. The tree is of medium height with an oval top. It is native from New Jersey southward and up the Mississippi Valley to Southern Indiana, extending well up the sides of the Appalachian Mountains, particularly the more southern portions. These trees are not among the first to be found on the sand islands along the coast like the two preceding species, but they are found in abundance just back of the marshes. They are attractive trees at all seasons with their star-shaped leaves in summer and their brown bark and curious round fruits during part of the winter. In the more northern part of their range they are somewhat difficult to transplant, so that it is probably best to move them only in very early spring. They may be grown quite a little north of the regions where they are growing wild.



NORWAY MAPLES

The foliage of Norway maples usually turns a bright yellow before dropping, although sometimes the leaves begin falling from the ends of the branches without coloring.

scape. These trees grow naturally on well drained soils all through the eastern half of the United States, including the sand islands along the coast, so that they are adapted to general planting except in sub-tropical and semi-arid regions. Under the latter conditions they could be used if some irrigation were possible. They can be used wherever there is sufficient moisture for grass to be grown as the lawn cover.

Another of the showy red trees in the fall landscape

It is a most desirable tree for home ground planting.

Another desirable tree for brilliant fall color is the sour gum or tupelo (*Nyssa sylvatica*). This makes a large almost round-headed tree with very dark green foliage in the summer and brilliant red leaves in the autumn. Even as early as August there may be a few scattered leaves that change color, giving promise of the brilliancy that is to follow. The tree is common in New England and the northern states and is well dis-

tributed throughout the eastern half of the United States. It is frequently found in swamps or in low ground, seems to succeed well on high dry ground, but probably prefers heavy land, while the sweet gum is found in greater abundance on lighter soils.

The scarlet oak (*Quercus coccinea*) is even brighter than the red oak in its fall colors and is equally as brilliant as the gums. Its foliage being more finely divided than that of the red oak gives it a lighter, more airy ap-

The fall foliage is almost as brilliant as that of the scarlet oak, but instead of dropping from the tree on the approach of winter many of the dead leaves remain on the tree until spring. Different specimens vary greatly in the number of leaves they retain, some trees shedding their leaves almost as completely as the red oak and the scarlet oak, while others appear to retain practically all of them until late in the winter. The pin oak seems partial to wet heavy soil although it succeeds under a wide range of conditions.

In marked contrast to the brilliant reds of the trees already mentioned is the yellow of the sugar or hard maple (*Acer saccharum*). This is a native of gravelly and other well drained soils of the northern states and southward in and near the mountains. It reaches its greatest perfection in Western New England, New York, Ohio and Kentucky, but is adapted to a wide range of climate and soils, though it is not at its best in the sandy lands near the coast, especially in the south. It is a large oval-headed tree of handsome appearance at all seasons.

The Norway maple (*Acer platanoides*) vies with the sugar maple in the brilliance of its yellow foliage in most



TULIP TREE

Another one of the yellow foliaged trees that adds much to the landscape from Pennsylvania and Kentucky southward. It is beautiful in combination with the tupelo or sour gum or the sweet gum.

pearance while the red of its leaves is most emphatic. It too is widely distributed throughout the eastern half of the country and is found native especially on the gravelly ridges and on lighter drier ground. It is not quite such a large tree as the red oak, but is well worthy of culture to help give variety in the autumn effects and can be used to advantage where a slightly smaller tree is desired or one that is a little less sombre in general effect.

The pin oak (*Quercus palustris*) also has brilliant foliage and is especially desirable where a trunkless tree is desired, that is, where it is desired to have the foliage extend from the ground to the top of the tree. The tendency of the limbs of the pin oak is to droop, and even if the tree is started with a trunk the drooping of the limbs as the tree grows older will have a tendency for them to approach the ground, although if this effect is desired a tree should be planted that has never had the lower limbs removed sufficiently to show a well-defined trunk.



FLOWERING DOGWOOD

A so-called flowering dogwood in its native habitat standing beside the trunk of a beautiful specimen of shag-bark hickory. The foliage of the dogwood turns a bright red and adds greatly to the autumn landscape.

seasons, although as a rule its leaves drop more quickly after coloring. It, like the pin oak, is a desirable tree to grow without a visible trunk with the branches resting on the ground. Its branches have a tendency to droop slightly which, with its tendency to form a low head and the denseness of the top, make it a most desirable tree to grow in this manner. It is a medium-sized round-headed tree that is rather undesirable when grown with a trunk because the dense top makes it almost impossible to maintain a sod under it.

The tulip tree (*Liriodendron tulipifera*) also called tulip poplar and yellow poplar, also has clear yellow fall foliage, but as the leaves drop more quickly after turning than some of the other trees it does not always make as much show in the landscape as some of the other trees, but it is worthy of planting for its yellow color in autumn. It is one of our largest trees, oval-headed and of rapid growth. It is native from Pennsylvania and southern Ohio and Indiana southward. It succeeds un-

If the top should die in transplanting, but the root should live and put out a new shoot, it is better to care for this shoot and develop a tree from it than to try transplanting another tree, because a root once established will soon grow a new top. With other shade trees, especially the oaks, the reverse is true.

The foliage of the poplars also turns yellow, but because the leaves of many of them drop so early and because of the many undesirable qualities of the trees for ornamental planting under ordinary conditions they should usually not be considered. They are useful along streams in open meadows on large estates, also in regions of small rainfall but for small places in humid climates they should be omitted from the list of desirable trees to plant.

The yellow fall foliage of the American elm (*Ulmus Americana*) is also not available for effective color combinations because the leaves turn part at a time and drop before most trees begin to color.



A CLUMP OF SHRUBBERY THAT COULD BE A RIOT OF COLOR IN THE FALL

The *Spirea thunbergii* in the foreground would give a bright yellow and the *Philadelphus* in the background would also turn yellow for a very short time. By the use of sumacs, native roses, *Azalea vaseyi* and Missouri currant in such a clump reds could be added while spice bush would add a good yellow. The elm would be of little value in adding color as its leaves turn part at a time and fall immediately.

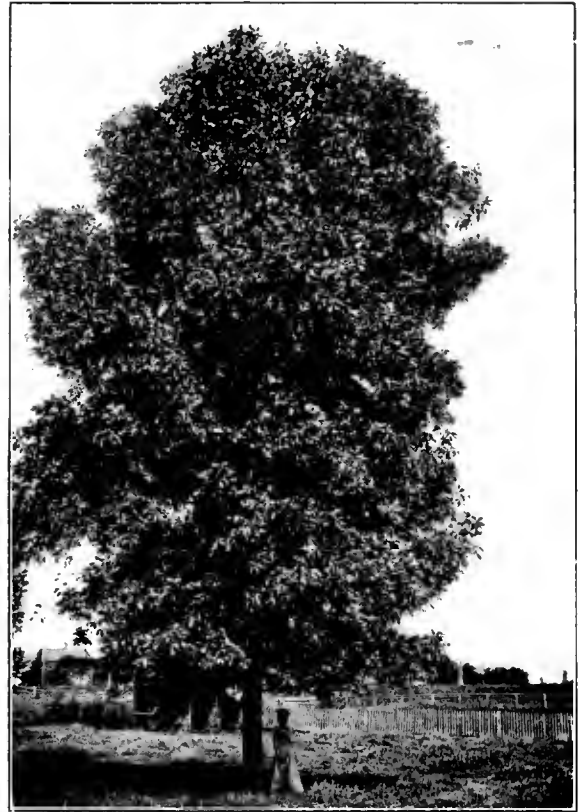
der cultivation considerably north of its native region. On account of its soft, fleshy roots it is somewhat difficult to transplant as it will not stand even as much exposure as most of our commoner shade trees. It should be transplanted only in early spring and the chances of success are increased if sizes under eight feet are used.

The hickories are another group of trees with bright yellow foliage that are decorative in the autumn landscape. One or another of the numerous species is native in all sections of the eastern half of the United States. Either the pecan (*Hickoria pecan*) or the shag bark hickory (*Hickoria ovata*) can be grown in all of

the country east of the dry farming belt and can thus combine some nut production with brilliant fall foliage. The hickories are medium-sized, oval-topped trees that are somewhat difficult to transplant on account of the long tap root. The trees are sufficiently attractive to be well worth some extra trouble in moving.

The ginkgo or maiden-hair tree (*Ginkgo adiantifolia*) is another tree with bright yellow autumn foliage that is most useful in ornamental plantings. Not only is the color a clear pure yellow but the peculiar shape of the leaf gives a texture to the tree that is quite different from that of most others. The leaves are shaped much like the pinnae, that is the smallest divisions of the frond of the maiden-hair fern, very much enlarged. The tree is attractive at all seasons. It is pyramidal when young but as it reaches maturity it forms a broad flat top. It grows to a large size. It seems to thrive in all parts of the United States except where there is such a deficiency of water that but few trees will succeed.

Although in the general landscape and in the arrangement of plants on places of an acre or more trees are of the utmost importance, yet when it comes to the average place which contains less than an acre and usually less than half an acre the smaller growing plants are of far greater relative importance for at most there cannot be room for more than one or two large trees on such a place and the major color effect must be produced by smaller plants. Among the smaller trees the flowering dogwood turns a bright red which with the scarlet berries makes a brilliant show on the approach of freezing weather. This tree sometimes attains a height of twenty feet or more with age, but is usually



SHAGBARK HICKORY

A nut-bearing tree that is valuable as an ornamental and adds a touch of yellow to the autumn landscape.

much smaller. It is an attractive tree with its foliage arranged in horizontal layers. Of course the showy white flowers in spring give it an added value for ornamental planting.

Of the small trees with yellow foliage the sassafras (*Sassafras officinalis*) is probably one of the best for the home grounds. Sassafras grows in thickets or sometimes singly where it occasionally becomes a large tree. Its value on the small place is chiefly as a small tree or as a mass or thicket. It is difficult to transplant, but when once established it can be trained as a tree or be encouraged to make a clump.

In the south the crape myrtle (*Lagerstromia indica*) becomes a small tree and turns a brilliant bronze almost or quite red in many cases. It is much grown for its summer and early fall flowers, but it also has value for the color of its ripening foliage on the approach of cold weather. It is widely distributed in gardens in the south and is easily



SMOOTH SUMAC

The dwarf or smooth sumac is one of the showiest of our low-growing plants in its fall coloring. It turns a bright red and holds for a long season. The staghorn and several other sumacs are equally valuable as ornamentals. Even the poison ivy colors brilliantly. The European or common mist tree is dull yellow.

grown where the weather is not too cold. As far north as Washington and St. Louis it leads a precarious existence, because of the frequent cold winters.

Among the shrubs the sumacs probably stand first for their brilliant red fall colors. Every one is familiar with the magnificent show they make on the roadside and in waste places. They grow wild over a large part of the country and always add to the beauty of the landscape,—in summer by their dark green foliage, in autumn by the brilliance of their red leaves and in winter by their red fruits that hang on until spring. They are easily transplanted and easily grown. As a rule they do not make an attractive single specimen, but when grown in masses are most effective.

The staghorn sumac (*Rhus coccinea*) grows to a height of ten feet while the dwarf sumac (*Rhus glabra*) grows only two or three feet high and has bright shiny

of attractiveness. It is an introduced plant that seems to thrive under almost all conditions. It grows close to ocean spray and where the dry winds of the plains strike it if provided with a moderate amount of moisture at the roots. It is easily transplanted and seems to grow well in all kinds of soil.

The common barberry (*Berberis vulgaris*) is also attractive, but because it harbors the wheat rust fungus, it should not be planted, especially as there are so many attractive plants that do not keep bad company.

Another plant with bronze foliage in the fall is the Oregon grape or mahonia (*Berberis aquifolia*). This is almost or quite evergreen in the north, that is it holds most of its leaves through the winter, although they turn a bronze color on the approach of cold weather.

The Missouri currant is another shrub that has red in its fall foliage, but it is mixed somewhat with yellow



GINKGO

A handsome oriental tree that adds a touch of pure yellow to the autumn landscape and makes a beautiful contrast to the reds of the red, scarlet and pin oaks.

leaves as though varnished. Other species are intermediate in height. The mist tree or smoke tree (*Rhus cotinus*) is quite distinct from the other species in appearance and its leaves turn yellow instead of red. The native American form (*Rhus cotinoides* of former times) has reddish foliage on the approach of winter.

Another showy shrub that has red foliage is the Japanese or Thunberg's barberry (*Berberis thunbergii*). There is some yellow also in the coloring of this plant that helps to give it a most brilliant and striking appearance when in front of other shrubs or in a clump by itself. It is rather late in turning and dropping its leaves so that it helps to prolong the season. Its full crops of scarlet berries also help to lengthen the season

that helps to give it an even more vivid hue than foliage that is solid red. It adds greatly to the final show of the fading year. On account of the white pine blister rust there is a restriction on the growing of currants in some parts of the country and an even more strict quarantine on their shipment in many cases. This is one of our native plants and one of the satisfactory ones for ornamental planting. Its showy yellow flowers in spring are also attractive as well as its foliage through the summer. It is easily transplanted and seems to grow well on most soils.

Another source of red for the fall garden are the Japanese maples of which there are two distinct types of varieties, those with red foliage and those with green

foliage. The latter are better. They give a brilliant touch of color in the spring when in bloom and again in the fall when the leaves turn.

The bridal wreath spirea (*Spiraea prunifolia*) turns a deep bronze before the leaves drop and makes a good plant to use among those having yellow or bright scarlet leaves. Thunberg's spirea (*Spiraea thunbergii*) has bright yellow foliage.

The foliage of the cornels or bush dogwoods like the silky dogwood (*Cornus sericea*), the red-stemmed dogwoods (*Cornus alba* and *C. stolonifera*), and the paniced dogwood (*C. paniculata*) show a mixture of red and yellow in their ripening foliage with a preponderance of the effect of the yellow. Unfortunately the leaves soon drop after changing color.

Some of the Viburnums as the arrowwood (*Viburnum dentatum*), the black haw (*V. prunifolium*), and the high bush cranberry (*V. opulus* or better *V. Americanum*) all show yellow in their ripened leaves. Other Viburnums like the dockmackie or maple-leaf Viburnum (*Viburnum acerfolium*) have almost white leaves slightly tinged with pink.

Another native plant with bright yellow autumn foliage is the spice bush (*Lindera benzoin*). It is native to moist places usually in dense shade and under these conditions the foliage is rather sparse, but when it is cultivated, especially in the open, it responds with much more abundant foliage.

Azalea Vaseyi is one of the native azaleas that has a brilliant fall color in its foliage. These leaves turn a brilliant bronze and are very showy.

In addition to trees and shrubs vines may also add much to the fall color about the home. Among the best of these is the American ivy (*Ampelopsis quinquefolia*) variously called Virginia creeper, woodbine, and five-leaved ivy. This turns a brilliant crimson early in the autumn and the leaves hold on well toward winter. The usual form climbs by means of tendrils, so needs a fence or other support upon which to climb, but there is a form that has sucking disks instead of tendrils and this of course can climb on stone or brick walls that are not too smooth. It is native throughout a large part of the United States and seems to be able to grow almost anywhere.

Another vine with yellow and red foliage is closely related to the above and goes by the name of the Boston ivy. This climbs on stone and brick walls.

The false bitter-sweet (*Celastrus scandens*) has bright yellow fall foliage, but it soon drops. It climbs by twining.

Another vine with brilliant red foliage at the end of the growing season is the poison ivy (*Rhus toxicodendron*) also called three-leaved ivy and miscalled poison oak. It is native over a wide range of territory and should be eradicated near dwellings and wherever people are likely to frequent.

PHILANTHROPY OR EFFICIENCY

(Cont'd from page 643)

problems are quite different from those any other country has faced, and what may apply to eastern Canada and Maine is the wrong system for Louisiana or the Northwest. On the lands of the same paper company in Ontario or Quebec black spruce will have to be differently treated than white spruce. Even the age of a tree can not be used to determine a selective cutting, maturity being reached at different times for the same variety of tree in different soils and topographic locations. It is not the purpose to give a discussion of scientific cutting methods here, but only to emphasize that the application of forestry cannot be put on a textbook rule of thumb

basis and is inseparably connected with the specific problems of efficient and economic logging. It can be handled only by that department which directly plans and controls all the woods operations.

Behind the new movement are such men as Ellwood Wilson, chief forester of the Laurentide Company of Quebec, and a leader in the application of practical forestry in America. The Laurentide Company is one of the largest and oldest newsprint concerns in America and it is significant that it should also become a leader in the idea of forest engineering efficiency versus weak-kneed philanthropy.



CHINESE FORESTRY IN 1919-1920

JOHN H. REISNER, DEAN

College of Agriculture and Forestry, University of Nanking, Nanking, China

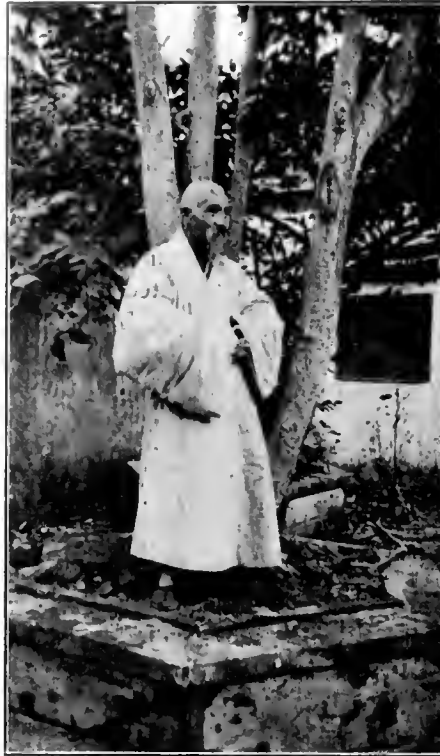
PROGRESS denotes correctly the present condition of forestry in China, this country so long used as an illustration of the dire results that follow the depletion of forests, and undoubtedly in greater need of scientific forestry than any other large country in the world. The year ending with the spring planting, 1920, showed much progress over the previous year, which was described in the author's previous article under a similar title. The outstanding developments of the year were the organization of a provincial forestry service for Shantung Province; the enlarging of the forestry organizations in a number of provinces; the increased activity and services rendered by the Kiangsu Provincial Forest Station at Nanking, established in 1916; the extension of the forestry work being undertaken by three government railways, namely, Lung Hai, Peking Hankow, and Tientsin Pukow Railroad; increased educational interest in forestry particularly as part of the curricula of government agricultural schools; the increased production of forest nursery stock; and the greatly increased number of district magistrates, agricultural societies, small companies, and individuals undertaking forestry work. Although a numerical expression of this progress is open to criticism, it is fairly safe to estimate a conservative expenditure for various forestry enterprises, mainly nursery work and forest planting, at from \$200,000 to a quarter million

dollars, the production of 100 million trees in over one thousand nurseries, and the planting of twenty-five to thirty million trees on 100,000 acres of land. This may seem small when compared with some other countries, but large when one considers the background and the fact that China's interest in forestry is only a very few years old.

As indicated previously forestry is not developing in China as it has in western countries, with the Central government assuming a very large share of financial and administrative control, but by individuals, societies, or companies, districts and provinces. And this condition may be expected to continue even in face of a marked activity on the part of the Central government. Individuals, companies, and small political units in China will have from the outset a much more important place in reforestation projects than similar bodies have had in the West. This is an important fact, and argues well for the future of forestry in China.

The observance of Arbor Day is spreading widely and rapidly and is becoming of increasing significance.

It is a national holiday. It is observed by high officials as well as the school children. With the development of the School Nursery idea, that is, for the secondary schools to have their own school nurseries, as many western schools have their school gardens, and the children get to raising their own trees,



THE CHINESE PRIESTS HAVE PRESERVED MANY TREE SPECIES IN THE TEMPLE AREAS WHICH OTHERWISE WOULD HAVE BEEN DESTROYED



A GENERATION OF PROTECTION WOULD GIVE TO CHINA MILLIONS OF ACRES OF GOOD SECOND-GROWTH TIMBER



FUEL FOR THE CITY TO BE "TRADED IN" FOR OIL AND RICE AND OTHER NECESSITIES BY THE COUNTRYMAN

it will add much to the influence of Arbor Day not only on the children, but also on the community. Arbor Day is rapidly becoming indigenous and may be expected to



"CHINA HAS AT LAST STARTED TO REFOREST HER TEN THOUSAND BARREN HILLS." THIS SHOWS THE WORK IN PROGRESS UNDER THE DIRECTION OF D. Y. LIN, M. F., A GRADUATE OF THE YALE FOREST SCHOOL

be one of the important factors in hastening forestry development in China.

The outstanding forestry development continues to be that of the Kiangsu Provincial forestry station, started in 1916, located near the famous Ming Tombs in Nanking, at the head of which is Mr. Song Sing-moo, a graduate of the Philippine School of Forestry, with twenty-one assistants, two of whom also received their forestry education in the Philippines. The budget for this work last year was \$34,000, voted by the Kiangsu Provincial Assembly and paid wholly by the province



THE RESULT OF PIONEER WORK. THIS IS A SMALL MOUNTAIN IN THE FAMINE AREA OF SHANTUNG PROVINCE WHICH HAS BEEN SUCCESSFULLY REFORESTED

through the Provincial Department of Finance. Thirty-four thousand mow of land have been replanted to date with two and a half million trees, including about one million trees planted on 11,000 mow of land last Spring. Three nurseries were maintained, with an area of 371 mow, carrying 1,275,000 transplants and about 3,000,000 seedlings divided among seventy-three different species. Trees and seeds for nurseries and over 50,000 trees for transplanting and for use in the observance of Arbor Day, were distributed to 186 district officials, agricul-



EACH FALL THE MOUNTAINS AND HILLS NEAR THE LARGE CITIES YIELD UP THEIR SEASON'S GROWTH OF GRASS TO THE BUSY FUEL GATHERERS

tural societies, agricultural and forestry stations and companies or individuals. There are three substations already located in important parts of the province with two more being planned for. In response to a proclamation by the Governor two years ago instructing district officials to develop forest nurseries in their respective districts for demonstration purposes as well as for supplying trees for planting to the farmers, encouraging headway has been made, and a large number of such nurseries have been established. Sixteen students are now being given practical training at the central station in Nanking, having been sent from various parts of the province. They are given class work in the morning and field work in the afternoon, and after three years of such training they will be sent back to carry out forestry work in their home districts.

The newest provincial development has been in Shantung Province, which has come into world prominence through the "Shantung Award" of the Paris Peace Conference. This work was organized by Mr. D. Y. Lin, a graduate of the Yale Forestry School, and at present of the Forestry Department of the College of Agriculture and Forestry of the University of Nanking, an American Missionary Institution at Nanking, China, who loaned him for the work at the special request of the Shantung Civil Governor. A Provincial Forest Service has been established, with a Chief Forester and eleven assistants. Work was prosecuted so vigorously that the first planting season saw the organization of three forestry stations, the establishment of three nurseries with plans for two more for the following season, over 550,000 trees planted on 2,000 mow of land and an additional 3,000 mow seeded. The budget calls for about \$22,000, payable through the Provincial Treasurer. Three government railways are engaged

in reforestation work looking forward to supplying their own ties and other timbers used in railroad construction and maintenance. Several other railways are contemplating similar developments. The budgets are voted by the various railway administrations interested. The forestry work of the Lung-Hai Railway, which is financed by Belgian interests, is under the direction of Mr. J. Hers, with a budget for the year of about \$17,000, which maintains a regular staff of about 50 men, including laborers, a large central nursery with three smaller ones controlled by it, in all about 120 mow in nurseries with a million and a half seedlings, transplants and cuttings. The reforestation has been mostly along both sides of the railway where 4,000,000 trees have been set out, including over 800,000

the past season. The Tientsin-Pukow Railway forestry work has a budget of about \$6,000 and is in charge of a graduate of Harvard Forestry School. About 850,000 trees have been planted to date, three-fourths of them this last year. There are two nurseries, one with about 640,000 seedlings and transplants. This work was begun in the late summer of 1918 and is just getting under way. The Peking Hankow Railway's forestry work is under the direction of Mr. Ngan Han, a graduate of the Forestry Department of Michigan State University. A large tract of mountainous land

in Southern Honan is being reforested, and while no detailed report can be given, the work is progressing nicely.

It would require a large volume to give the details of the various district forestry enterprises, which is not the purpose of this review. It should be noted, however, that out of the 1800 or more districts (counties) in China, probably twenty to twenty-five per cent have their own nurseries, or nurseries ad-

ministered for them and for the upkeep of which they are taxed. A few instances will indicate this local interest and progress. The Southern Chihli nursery has a budget of \$1600 which is raised by allocating \$40 to each of the 40 districts served. The Kao-Yi district of the same province has its own nursery, with a budget of \$1,080 which is raised from a local tax on cotton. The second nursery of the Chekiang Forest School has a budget of \$1500, a million and a half transplants and seedlings in its sixty mow nursery, and has direction

over eleven smaller nurseries. The second nursery of Shensi province, with three local nurseries under its direction has a budget of \$2,400, with a production of five million seedlings. This nursery has adopted the policy of giving free to anyone in their nursery area 50 trees and up to



TEMPLED WOODS. BUDDHIST MONASTERIES AND WOODED HILLS ALWAYS GO TOGETHER



LINING UP FOR THE 1920 ARBOR DAY PARADE ON THE CAMPUS OF WILLIAM NAST COLLEGE, IN CHINA

five pounds of tree seeds. For larger amounts a slight charge is made. The Kiangsu model forest plantation with its budget of \$1,590 from the provincial treasurer, in its two nurseries had about 2,000,000 transplants and seedlings and planted out about one-half million trees to the forest site. The Lin-Cheng district (Chihli) industrial deputy with his central nursery and four substations, his budget of \$1350 raised from house and land taxes, and 3,000 mow reforested to date, is planning to have every family plant five trees annually for each male member. The second Chekiang Provincial nursery supplied free of cost over a million trees, to 16 districts in addition to schools, farmers and others, from its 190 mow nursery containing more than four million transplants and seedlings, on its budget of \$2934 raised from local taxes.

Records secured from twenty-one forestry enterprises, including large and small, from North and Central China showed an expenditure for the year under review of \$106,000, a production of 26,500,000 seedlings (80 per cent of total) and transplants in the nurseries represented and three and a half million trees planted to forest sites on 15,000 mow of land. From data at hand and from first-hand knowledge, conservative estimates of forestry expenditures and work last year would place the total amount of forest nursery stock raised at 100,000,000 trees, in considerably over 1,000 nurseries, with an expenditure of from \$200,000 to \$250,000. In addition there were probably between 25 to 30 million trees planted out to permanent sites on about 600,000 mow of land (100,000 acres). The largest nursery section is in North Kiangsu

around Yangchow, where an investigation showed an annual production and sale of between thirty and forty millions of trees, about one-half of which are pines.

An interesting and encouraging development is in the introduction of courses or departments of forestry into many of the secondary agricultural schools of which every province has from one to five. Anhwei Province is now teaching forestry in four of her five agricultural schools, Chekiang Province has a secondary Forestry school with a budget of about \$35,000, and a large enrollment. Graduates with forestry training will be in increasing demand, and the more imperative need would seem to be for more highly trained men than secondary schools can turn out. The present forestry education is an important factor in the situation both as it affects forestry personnel and development of an intelligent public opinion on forestry matters.

There is a phase of forestry development in China that America should be proud of, which is, that in practically all the large forestry enterprises men trained under American, or American trained, foresters are in the lead. Graduates of Yale, Harvard, Michigan, Syracuse and Cornell, of the Philippine School of Forestry, and of the University of Nanking, China, whose forestry teachers are Americans or American trained Chinese, are all holding positions of responsibility, and some are holding the highest in the country. A Forest Service in China with as high ideals as the Forest Service in the United States will be irresistible and to it will be entrusted one of China's greatest problems and needs.

THE UNWELCOME GUEST

(Cont'd from page 641)

from the acts of a few. Are we to see a time when the person who goes into the open country for a vacation is automatically branded a rowdy because he enters the general class of tourists when he takes to the road?

America's outdoor fraternity, the family which early visits the great woods, open prairies and mountain valleys faces a really serious problem because of the stigma cast upon all travelers by acts of a thoughtless few. Concerted action is needed by every class of person who lives any part of his life in the open to remove this indictment by furthering the simple code of courtesy of the mountains, fields and lakes. When ordinary good manners are as much demanded by each of the other in the field as in the club or home, then the traveler will no longer be the unwelcome guest whether he himself is guilty of any infraction or not. It must become as much of a sin against society to break the social custom of the outdoors as it is to over-step general social practice in the centers of culture. When all who make up the fraternity of outdoors insist that every member be considerate of the other and observe general good manners in the open then indeed will many now antagonistic to all tourists

become hosts and the tourist who is a petty vandal will carry not only the ill-will of the farmer he has harmed but the brand of condemnation of his own brotherhood.

THE MOUNTAIN LION, OCELOTS, LYNXES AND THEIR KIN

(Cont'd from page 636)

oh! so savage and bad-tempered that it becomes quite out of the question to handle them. For a little while they follow their mother about, who initiates them into matters of hunting, climbing and other traits so essential to the forming of the true lynx character. I am not informed as to what time the young grow the ear-tuffs and the face-ruff, which constitute such conspicuous features of the head of the full-grown animal.

In former years, hundreds of lynx skins, of this species, came into the fur markets, and their pelts were highly esteemed. For instance, Canada lynx furs, imported by the Hudson's Bay Company in 1858 and offered for sale in London in January and March, 1859, amounted to the following: 1858—28,102; in 1857—26,794; in 1856—18,907, or a total of nearly 74,000 skins, their selling price being two dollars and forty cents each.

PROGRESS IN STATE FORESTRY LEGISLATION

PROBABLY never in the history of this country has there been such marked interest in forest preservation by State legislators as at the present time, report officers of the Forest Service, United States Department of Agriculture. No less than 33 States have now provided for some sort of forestry activities and 25 of these share in the Federal co-operative forest protection fund, allotted to States maintaining an effective fire detection and suppression system. Two others have applied recently for such assistance. Public backing of the movement to preserve the remaining forests from destruction by fire, and to put idle forest lands to work growing trees, is becoming widespread, and the effects of the popular demand for action is shown clearly in the State laws passed this year.

Pennsylvania, under the direction of Gifford Pinchot, the new Commissioner of Forestry, leads all States in forest activities. The biennial appropriation passed by the legislature and approved by the Governor carried \$1,870,000, an increase of \$863,300 over the appropriation of 1919; \$1,000,000 of the total is for fire protection. The legislature also passed an act empowering the Federal Government to acquire lands on the watersheds of navigable streams within the State, by purchase or condemnation, and to control and regulate such reserves.

The Minnesota Legislature was more generous with the State Forestry Board than ever before. A total of \$275,500 for general forestry work was appropriated for the next two years, of which \$125,000 a year is for fire protection. The last named sum was augmented by an additional allotment of \$44,000 from the State Board of Relief. For the equipment of a flying field near the Twin Cities, \$45,000 was voted. This provision was to meet the offer of the Federal Government to furnish the service of 12 planes if the necessary hangars and flying field were provided. While the primary purpose of this agreement is to supply aerial mail communication, the planes will be able also to render effective service in "spotting" forest fires.

In California, where there has been much favorable sentiment toward forestry for many years, the legislature voted a substantial increase in appropriation for the State Board of Forestry, for the biennial period beginning July 1. For the prevention and suppression of fires \$75,000 was appropriated; for general administration, \$27,000; for a study of watershed areas, \$10,000, and to establish and maintain State forest nurseries, \$35,000. The legislature also voted \$300,000 for the purchase of redwood timberland for park purposes along the State Highway in Mendocino, and Humboldt counties, the area to be administered by the State Board of Forestry.

Other important State forestry legislation passed this year was as follows:

Bills for the compulsory teaching of fire prevention

in public schools were passed by California, Rhode Island, and West Virginia. A similar measure was passed by the New York Legislature but vetoed by the Governor. New Jersey already has such a law.

Maine increased the annual tax on land within the forestry district from $1\frac{3}{4}$ to $2\frac{1}{4}$ mills on the dollar, the taxes thus collected to be used exclusively for protection from fire of the forests within the district; provided for the creation and management of State forests, acquired by purchase or gift, by the State Forester; adopted improved means for controlling the disposal of lumbering slash, and the encouragement of timberland owners to practice forestry on their lands through a concession in taxation.

Ohio passed a forest-fire law and appropriated \$5,000 a year for two years for the prevention and suppression of fires; also made an appropriation for the purchase of lands for State forests.

Tennessee passed a general forestry bill and appropriated \$10,000 for fire protection and \$7,500 for general forestry purposes.

North Carolina increased the State appropriation for forest protection from \$3,800 to \$9,000.

In Louisiana provision for State control of all natural resources, including forests, was provided for by Constitutional Convention held early this year.

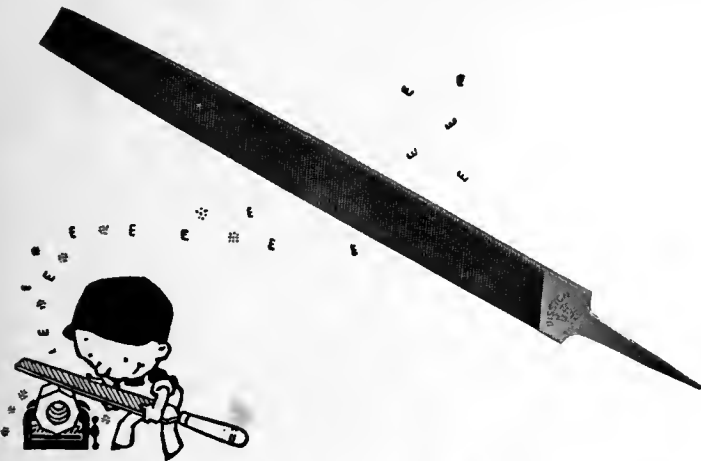
In New Hampshire provisions were made for leaving seed trees on cut-over pine lands, for redistricting of the State for forest-fire purposes, and for compulsory forest fire-patrol on large timberland holdings.

Connecticut provided for reorganizing the State forestry administration and protection work, and for more liberal appropriations.

Several of the other State legislatures have also had forestry questions under consideration, which have made for progress, even where, as in Florida, no definite legislative enactment took place.

The Georgia Legislature, has passed a bill providing for the appointment of a board to investigate the forest conditions of the State and to report legislation necessary to solve the forest problem. At the recent meeting of the Southern Forestry Congress, in Atlanta, it was shown that the lumber cut of Georgia has decreased 33-1-3 per cent in the past 10 years, while the production of turpentine and rosin has fallen off 75 per cent. In the opinion of foresters, Georgia will soon take a place with the Carolinas as an insignificant producer of naval stores.

In only one State, West Virginia, was the forestry situation given anything like a setback. In that State, in reorganizing the forest, game and fish department, forestry was at first entirely eliminated and then, just before passage, an optional provision was included in the fish and game bill, by which the new commission can, if it wishes, expend not to exceed a fourth of its appropriations for forest protection.



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CHICAGO TRIBUNE URGES PRACTICAL

SO far reaching has become the educational campaign of the American Forestry Association for a national forest policy and for increased fire prevention for the forests that the newspapers, long a unit in cooperating with the Association, are now demanding action in strong terms. The editorial cooperation with the Association's campaign is one of the big constructive pieces of work the newspapers are doing at this time. As an example of this was the avalanche of editorial expression against a tariff on lumber following the statement of the effect of such a tariff at this time by Charles Lathrop Pack, the Association's president. An example of this expression is well set forth in the Chicago Tribune whose editorial was headed "Lumber and Reciprocity" and in which The Tribune said:

Chicago Tribune:—Camouflaging its action as reciprocity, the ways and means committee of the House has adopted the Canadian tariff schedules to apply on all our imports from that country. The schedule provides a 25 per cent ad valorem duty on all finished lumber.

It is the finished lumber that is needed to build our homes. This rate is three or four times higher than the Payne-Aldrich rates of 1909 on finished lumber.

It is defended as a "protective" tariff. Whom does it protect? None but the southern and western lumber men. It does not protect the thousands of residents in this country who are eagerly awaiting an opportunity to build homes at a price within their means. It exploits them. It sacrifices the standing timber of this country and tends to fix permanently or increase the present prohibitive costs of lumber for building purposes. The estimated shortage of 1,250,000 homes in the United States is continued, with the chances in favor of an increase rather than a decrease of that shortage.

The arrangement in effect gives Amer-

ican mill owners an advantage estimated at \$12 per 1,000 in competition with Canadian lumber. This advantage is found not alone in the tariff but partly in the difference in freight rates for dressed and rough lumber, the latter costing about \$7.50 per 1,000 feet more than the former. It means an increase of \$250 to \$300 in the cost of the average workingman's dwelling.

It not only thus penalizes the present generation but will take a heavy toll from the future. The *American Forestry Association* has warned the public and supported its

"Great Oaks From Tiny Acorns Grow"—Great Flames From Tiny Sparks



Wahl—In the Sacramento Bee.

warning with incontrovertible statistics, that the United States will face a timber famine within 50 years. Every foot of needed lumber kept out of this country by the proposed tariff will help to destroy a tree in the United States. For the conservation of our resources it is essential that there be no such bar to the use of Canadian lumber in America.

The very point of reciprocity proves beyond dispute that legitimate American lum-

ber interests have nothing to fear from Canada. The fact that Canada has a 25 per cent ad valorem duty and an anti-dumping provision for an additional assessment of 15 per cent indicates that they fear American competition. Obviously if our lumber mills are sufficiently productive to menace Canadian lumber interests they would not be deprived of a reasonable profit through the competition of Canadian lumber. The fact is that our cost of finished production is below the Canadian cost. Also we are now exporting considerable quantities of undressed timber to Japan. If this is possible at a profit we need not fear to sell timber to our own consumers on an unprotected rate.

This editorial has been widely reprinted but The Tribune does not stop there in its campaign. It calls for some "Practical Politics" in an editorial of that name which follows:

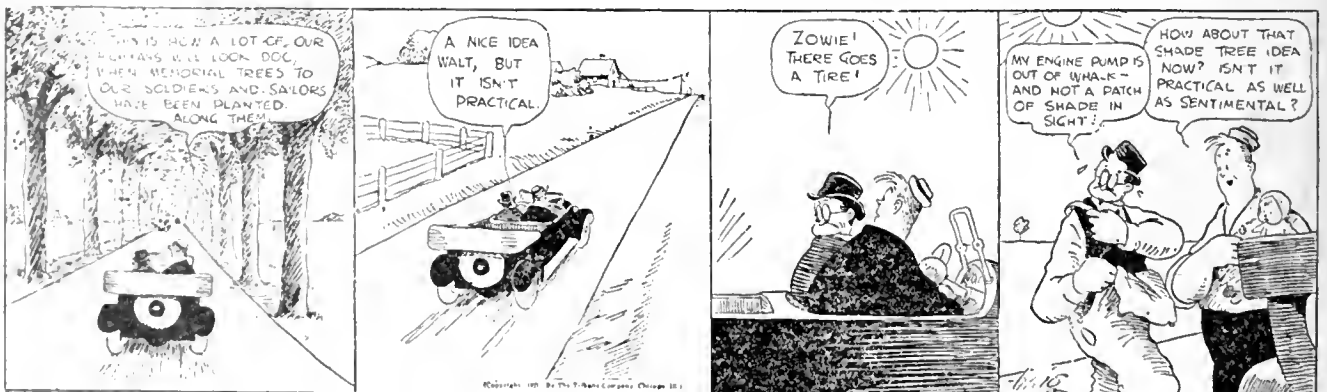
Chicago Tribune:—American Forestry, the magazine of the American Forestry Association, prints a map in the July number showing an area of 1,000,000 acres, covering more than half of four counties of north-eastern Pennsylvania, which is to be purchased by the government to protect the headwaters of the Allegheny river and to develop a renewal forest.

Is it any wonder that the United States senators and representatives from Pennsylvania are returned to congress by their constituencies term after term? They get practical results for their districts and their state. They are less concerned with panaceas or patent nostrums for the correction of national or international ills than with doing something which will improve the welfare of their constituents and provide for the future of their state.

Reforestation is a commendable enterprise. It not only conserves the water supply of a large section of Pennsylvania but

GASOLINE ALLEY

DOC NEEDS A DEMONSTRATION



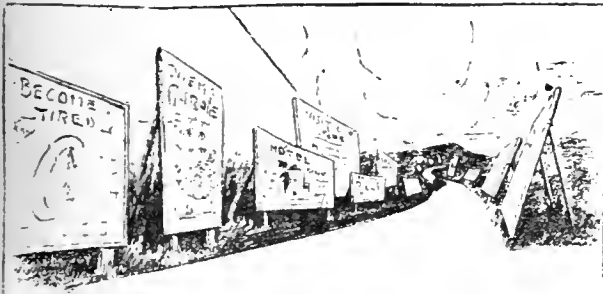
King—In the Chicago Tribune.

POLITICS AS AN AID TO FORESTRY

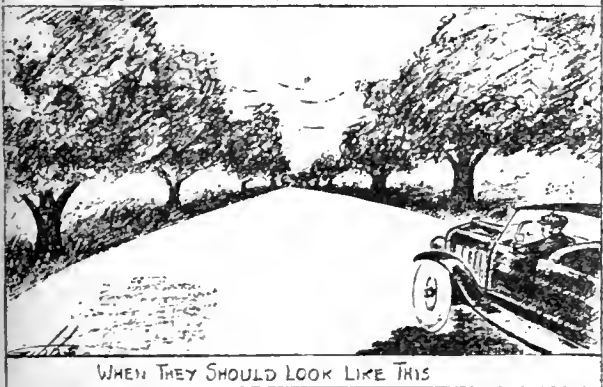
promises to provide much needed lumber at reasonable prices in the future. Pennsylvania makes it a practical reality through federal aid. The interest of its congressmen in the patent nostrums of legislation is merely in their value for trading purposes. What wise man would not trade a vote for the Norris bill for one favoring purchase of 1,000,000 acres of land for reforestation in his home district?

Why cannot the agrarian bloc in congress

THIS IS THE WAY



SOME OF OUR HIGHWAYS LOOK



WHEN THEY SHOULD LOOK LIKE THIS

Gibbs—In the Baltimore Evening Sun.

do as much for the middle west? Wisconsin has large tracts of land in crying need of similar reforestation, and worthless for any other purpose. Illinois and the entire Mississippi valley is in need of improved waterways. At least sixteen states of the middle west are asking for congressional approval of the St. Lawrence seaway. Many states and thousands of manufacturers want the elimination of the "Pittsburgh plus" system for fixing prices on steel products. There is plenty of practical work for the agrarians in congress. If the Pennsylvanians can get practical results in congress why cannot the middle westerners?

These are but examples of the way the newspapers of the country are keeping the value of forest products and the necessity of increasing the supply of those products before their readers. The *Peoria Transcript* points to the need of educating the public to the value of trees that the public may get an idea of the bigger proposition—

a national forest policy. This is from an editorial on "Peoria and Her Trees":

Peoria Transcript:—To the assistance of the interested citizens comes the *American Forestry Association*, realizing that its own work, which is much larger and farther reaching, can be better served when it has made the mass of the citizenship more intelligent on the whole question of trees. Business men of this country are paying millions of dollars a year in freight bills

because the center of the lumber industry is getting farther and farther away from the points of greatest consumption, the nation's factory centers. We must have a national forest policy that will put the idle acres in the middle west and in the east to work growing trees. In considering a national policy we must consider a disease. That disease is forest devastation, the *American Forestry Association* points out. Its effect is a slow sapping of national strength—through the steady exhaus-

when one of the country's greatest needs is to bring them further down. And that is not the only objection. Charles Lathrop Pack, of Lakewood, President of the *American Forestry Association*, makes the point that such a tax would be in direct conflict with a sound national forest policy. A tariff on lumber, he tells us, would put a premium upon every standing tree in this country. The force of that is beyond question. It will be nothing short of a form of economic suicide for the United States to make it more difficult for us to get a supply of a necessary product from foreign countries when our own supply is threatened with destruction.

Albany Knickerbocker Press:—Forest devastation has evidently reached the point where it is producing despairing cries and some ineffective legislation; it has become an equally national and state issue.

Sault Ste. Marie News:—"Idle land in this country must be put to work growing timber and that at once, for a crisis nears and when that crisis comes it will be the public as usual that pays the bill."

Mr. Pack speaks truly. The public is vitally interested. The criminal waste of

THE SPENDTHRIFT



Brewerton—In the Atlanta Journal.

tion of the national timber supply. The effect will become fatal when, through the shortage and high cost of timber, the United States is reduced to the level of western Europe, when wood is priced as an imported luxury, when not only manufactures and trade are handicapped by lack of it but the comfort of our own people and the efficiency of our agriculture are straitened by its scarcity.

Newark Ledger:—A tariff on lumber would send building costs up at a time

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our forests must be stopped and the quicker the voice of the people is heard in this connection the better for all concerned.

Johnson City (Tenn.) Staff:—Is it not high time we took steps along the lines of the Snell Forestry Bill to cut our freight bills for forest products and at the same time to remove one of the serious causes of freight car congestion by adopting a program which will put our 81,000,000 acres of wholly idle and 235,000,000 acres of partially idle lands to work?

San Francisco Chronicle:—The period of waste of our forest resources must now definitely come to an end. So far as possible, cut trees must be completely utilized. The wooded regions must be protected from fire. Reproduction must be promoted on all cut-over land. Such a policy requires the effective co-operation of state, national and local authorities and private owners.

Olympia (Wash.) Recorder:—In considering a national forest policy we must consider a disease. That disease is forest devastation, the *American Forestry Association* points out. Its effect is a slow sapping of national strength—through the steady exhaustion of the national timber supply. The effect will become fatal when,

through the shortage and high cost of timber, the United States is reduced to the level of western Europe, when wood is priced as an imported luxury, when not only manufactures and trade are handicapped by lack of it but the comfort of our own people and the efficiency of our agriculture are straitened by its scarcity. Abundance of wood for home and farm use, for varied manufacturers and for export trade has been a primary factor in our commercial supremacy, so important right now, and it is a factor which we are not going to surrender. The problem must not be met by using less and less wood, down to the level of civilized existence, as France has been compelled to meet it. It must be met not by decreased use but by increased production the Association well argues. It must be met in the American spirit of development, of enterprise, of an organized and far-sighted handling of our resources that will supply the future requirements of a continued liberal use of timber in national development and industries.

Trenton (N. J.) Times Advertiser:—Do you know that the annual consumption of newsprint would make a two-foot strip of newspaper reaching 40,000,000 miles or half way to the sun? The war left us in a state of mind whereby no set of figures could stump us or give us pause until this

statement from the American Forestry Association, and we must admit that it takes "some trees" to keep industry going in this country.

The tree is a lifetime proposition. A hurricane wiped out millions of them in the West the other day. A forest fire cut a swath in Canada recently and consumed trees that would have kept many factories going. The Forestry Association is working for a national forest policy which includes better fire protection methods. It also wants us to get better acquainted with trees. Under the pressure of necessity we must make the best of the knowledge we have of methods, imperfect though that knowledge may be. The handling and perpetuation of our forests in the last analysis must, however, rest on a solid foundation of careful and thorough forest investigations.

St. Paul Pioneer Press:—It cannot be from lack of information on the subject or due appreciation of its importance, because the ear of the people has fairly been stunned with its reiteration; but the fact remains that Minnesota never has been swept into real action in the matter of reforestation. It will go on living on the reputation of its great pine forests when the last stick of merchantable timber has disappeared and without a clear working and workable policy of replacement.

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 to the Association.

ARKADELPHIA, ARK.

By Arkadelphia Chapter, D. A. R.: The Boys Who Fought in the World War.

HELENA, ARK.

By School Improvement Association: Marvin M. Grauman, Marcus Collins Hammett.

PUEBLO, COLO.

By Mrs. Samuel Spencer: Lt. Glenn K. Spencer.

ATLANTA, GA.

By Alliance Francaise: Marshal Joffre. By Kindergarten Alumnae Association: Madge Bingham. By Council of Jewish Women: Martha Wolsenstein. By Druid Hills Kindergarten Pupils: Mother Goose. By Witches' Club: Ella Wheeler Wilcox. By Overseas Girls' Club: One of the War Poets. By Georgia Chapter of the National Society of Daughters of the Founders and Patriots, O. Henry. By Children of American Revolution, Eugene Field. By Margaret A. Wilson Chapter, Children of the Confederacy: Uncle Remus. By Mrs. J. C. Oliver, Dr. Frank Crane. By Mrs. J. M. High, Rudyard Kipling. By Virginia Federation of Women's Clubs: Oscar Wilde, Edgar Allan Poe. By History Club: Thomas Nelson Page.

EVANSTON, ILL.

By William Dawes Chapter, Children of the American Revolution: William Eastman, Jr.

PARK RIDGE, ILL.

By Park Ridge Improvement Association: Roosevelt Gold Star Boys.

STERLING, ILL.

By Wallace School, William Loran: Unknown Dead. By Sterling Woman's Club: Harry Erisman.

WINNETKA, ILL.

By Winnetka Post, American Legion: Phillip Comfort Starr, Vincenzo Di Giorgio, Roswell Hayes Fuller, George Raymond Kelly, James Edward Hayes, Dinsmore Ely, Wesley Major Juleff, Pasquale Salerno, Charles Douglas Weart, Fletcher Ladd McCordic.

CONNERSVILLE, IND.

By Fayette County Auxiliary, American War Mothers and Kiwanis Club: Reginald Fisher, Glen Sample, Harry Selm, Vernon Doll, Clyde Colshur, Charles Jones, Paul G. Hamilton, Benjamin Jones, Alfred Morrison, William R. Hunter, Roscoe Wrigley, Louis Daniela, Paul Wolf, Raymond C. Keller, Charles R. Prather, Arthur Case, Teddy Brewer, Francis Michaels, John Plough, Ira Gwinnup, Clyde Allison, Louis Myers, Carl Stam, Ernest Schoenburn, Garret Thompson, John Reynolds, Hansford Hooper, Murray Dawson, Howard Gansert, Jasper J. Murphy, Harry Duerson, Merle Worthington, General Edward Chrisman.

MARTINSVILLE, IND.

By Woman's Club: Morgan County Boys Who Served in the Great War. By North School: Morgan County Boys Who Enlisted from the School.

KEOKUK, IOWA.

By Civic League: Albert L. Agnew, Oscar Althar, Thomas E. Barnett, George Bauer, Merle X. Boyer, Lawrence Buffington, Charles Otto Bunyan, Walter Couchenour, William LeRoy Crane, Samuel DeWitt, Tony Dunn, John Clines, Edward Grober, Joseph Harper, John Albert Hartung, Lester Harter, Charles Hilsabeck, George Hogoboom, Vincent Hunt, Robert Jacques, Leo P. LeBron, Martin W. Little, Charles A. Lucas, James McKenzie, Richard S. Manning, Herman Miles, Ira Morehouse, Guy Clark Morris, James Neill, Thomas J. Palmer, B. J. Pohlpetter, John G. Robertson, Clyde W. Scarlett, Leo Schevers,

Arnolds Schmeig, John Perdeu Sheldon, George Stillman, Mark R. Tighe, Carl W. Thieme, William Weider, George Welsch, Henry Young, Chester Lee Baker, Oakle A. Jackson, Karnie Knight, John M. McCampbell, Glen A. Morgan, Albert Glen Osburn, Walter Wells, Carroll Joy.

WEBSTER CITY, IOWA.

By Ladies' Cemetery Association for Workers, Ladies' Cemetery Auxiliary, Hamilton Co. Post 191: The Men Who Died in Service (2).

BEREA, KY.

By Woman's Club, Everett Riley Kerby.

CHARLEVOIX, MICH.

By Mr. and Mrs. E. D. Shapton, Corp. Leslie Thomas Shapton.

CHARLOTTE, MICH.

By City of Charlotte: Harold N. Teeter, Donald Hubert, Verne Betts, Van E. Boyd, Erceel Ray Canfield, Kenneth Campbell, Rufus Perry Childs, Ora Vern Church, Roy Cole, Charles William Ernsberger, Edward Foote, Walter E. Franklin, Irvin M. Greenawalt, John King Jacqueline, Orland Johnson, Frank J. McGrath, Frank Frederick Miller, Ray John Morrow, Harry Norris, Alpha Rice, Clarence C. Roe, Eugene V. Shafter, Ernest Swan.

IONIA, MICH.

By Stevens Thomson Mason Chapter, D. A. R.: Men and Women of Ionia County. By May Tuttle Nead, Jay A. Tuttle. By Nora Morse Taggart, Myron Morse. By Addie Heald Marshall, James Heald.

WALKERVILLE, MICH.

By Mrs. Laura Kipkey: George Warren Zimmerman.

HANNIBAL, MO.

By Women's Auxiliary, American Legion, Emmett J. Shields Post, No. 55: The Men of Hannibal Who Died in the Great War.

GOTHENBURG, NEB.

By Gothenburg Women's Club: Manley Hoppes, William Sievers, William Miller, Corp. Harm Martens, George Maline, Ivor Stewart, Carl Kuhlman, Horace Golden, Corp. Ralph McFate, William Golden.

SARGENT, NEB.

By Woman's Club, Community Boys.

BROOKFIELD, N. Y.

By Brookfield High School: Meade Palmer, Charles Vunk.

GENEVA, N. Y.


By Nature Study Department, Woman's Club: Jack Kleinlein, Clarence J. Bolton, Frank Blaine Sloan.

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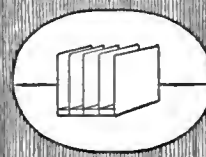
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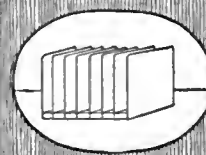
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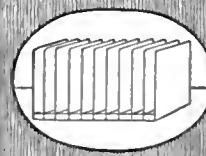
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WISCONSIN FORESTRY ASSOCIATION.

The Wisconsin Forestry Association, organized last winter as a result of a call issued by a score of state-wide industrial, commercial, farming and civic associations and organizations of women, is working actively and steadily for the adoption in Wisconsin of a comprehensive state forestry policy, says the Milwaukee Journal. It seeks to bring about the reforestation of non-farming land located anywhere in Wisconsin. It advocates growing forest products within the state, utilizing hundreds of thousands of unproductive acres and increasing and making permanent the great wood-using industries, now rapidly dwindling. It urges adequate protection of forest lands against fire, a change in the taxing system that will conserve standing timber, and just treatment, in the way of taxation, of settlers and communities within forest areas.

The Association also urges the reforestation without delay of the shores of lakes and streams; the creation of village, city and county forests and the planting of native trees along all state and county trunk roads.

The Association, now working under a temporary organization, will soon file articles of incorporation and effect a permanent organization. Already it has a membership which includes lovers of nature, lumbermen, paper makers, manufacturers, professional men and prominent women.

Already the foundation has been laid for a broad, constructive state forestry policy. The legislature took the initial step so to amend the constitution as to empower the state to acquire and reforest nonfarming lands. Bills to enable the state to acquire tax title deeds to land suitable for forestry, to permit towns, villages and cities to establish memorial forests adjacent to their municipal limits, to insure better fire protection and to multiply the growth of planting stock in the state forestry nursery for reforesting municipal and private lands are among the forestry measures that have been enacted.

The Association is planning a systematic campaign preparatory to the legislative session seventeen months hence. Henry C. Campbell, assistant editor of The Journal, is chairman; F. W. Jones of the Brown Land and Logging Company, Rhinelander, is vice chairman; George D. Bartlett, Milwaukee, secretary of the Wisconsin Bankers' Association, is treasurer and C. L. Harrington, forestry member of the state conservation commission, Madison, is secretary. Any one of them will be glad to reply to inquiries regarding the organization, its purposes and the conditions of membership.

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PULPWOOD FROM WOODLOTS.

With recent investigations indicating that the pulp and paper industry of New York is finding only half its supply of raw material within the state, the foresters of the college of agriculture at Ithaca point out that the time is rapidly approaching when the farm woodlot as a source of pulpwood may well be considered.

A careful estimate of the available supplies on privately owned land within the Adirondack region reveals only a sufficient quantity to maintain the present cut for a period of about fifteen years. This condition will make necessary certain changes within the industry, all of which are of more or less vital importance to a large number of farm woodland owners in the state.

There is within the Catskill and southwestern counties a large stand of material suitable for pulpwood which is now largely unavailable because of freight rates.

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The operation of turpentine pine trees does not lower the strength of the wood, according to information obtained by the Forest Products Laboratory of the Forest Service, United States Department of Agriculture. The crude turpentine, or oleoresin, is not drained from a reservoir in the tree, but is produced by the living cells in the sap wood at or near the spot where the cut is made on the trunk. No turpentine is produced by the heartwood because all of its cells are dead. The heartwood may be saturated in places with pitch, but this does not readily flow out as does the resin freshly formed in the sapwood. The major part of the tree is not affected in any way, and the loss due to death of trees or to a reduction or degrading of lumber is very small when the proper method of turpentine is followed; this loss is more than offset by the additional revenue obtained through turpentine. The greater part of the wood that is chipped away would not have become finished lumber, but would have gone into slabs and edgings at the sawmill. With proper treatment the turpentine faces remain healthy, and the wood underneath does not become saturated with resin to any great extent.

AMERICAN WOOD PRESERVERS' ASSOCIATION.

The Service Bureau of the American Wood Preservers' Association has been established to promote the use of wood properly treated to resist decay, marine borers, and insect attack, thereby aiding in the conservation of the forest resources of the nation by making one stick of timber do the work of several.

Headquarters are maintained which act as a repository for reliable information on the practice of and the results obtained from the art of wood preservation.

The value of wood for construction purposes is fairly well understood but for permanent structures treatment with a standard preservative, such as creosote or zinc chloride, is absolutely necessary.

The policy of the SERVICE BUREAU is to give the public reliable information on the treatment of timber according to the standards of the American Wood Preservers' Association and the use of treated wood.

Publicity will be given to facts relative to treated wood from the standpoint of economy and conservation through the public press, trade and farm papers, and technical journals.

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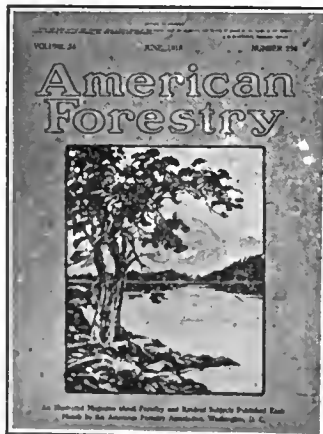
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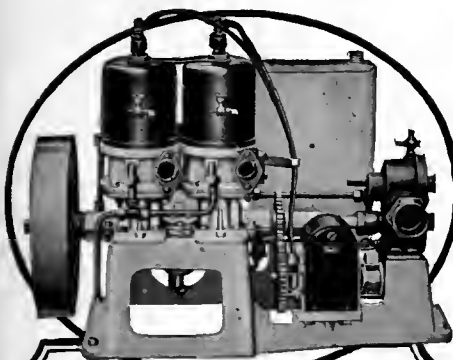
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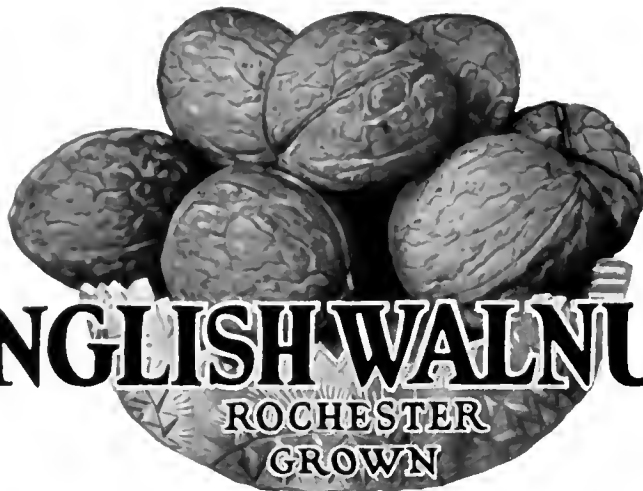
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In the mountains of Virginia the huckleberry, the dewberry, the raspberry, and the blackberry, are the "meat" of all frugal souls who realize that Old King Frost spoiled the fruit crop for this year. "Recently," says the Forest Service of the United States Department of Agriculture, "one of these souls who has respect for the service came into the office of the supervisor, saying that he would like to have a permit to pick berries on Government land.

"He rather surprised us," the report states, "but after some figuring it was decided to give him a 'hunting and fishing permit' with 'gather berries' inserted. This hunting and fishing permit carries a clause that states, 'You are privileged to hunt and fish on Government land within the Natural Bridge National Forest, provided that you will report all forest fires and will assist in suppressing such fires as may occur within a radius of 5 miles from the point where you are hunting.' The permit was issued and the permittee departed on his way happy, but he started something.

"It was but an hour or so until another came in. 'Please, kin I git a permit to get huckleberrys offen the mountain?' and that was the beginning of a steady stream. Everybody wants a permit, and everybody's gettin' it. In less than a week we issued 100 permits and most of these included the whole family. The roving small boy wants one for his very own and he is given it, but he is asked to read it 'out loud' before he takes it away and his big impression that he also takes away is that there must be no 'fire on the mountain.' This is not the midst of a fire season, but it can safely be said that the idea of protecting the forests from fire was never so generally and generously scattered among the people in and around the Natural Bridge."

NEW SECTION FOR LABORATORY.

A new section for industrial investigations has recently been added to the Forest Products Laboratory and the Forest Service of the United States Department of Agriculture believes it will meet a real need. The work will embrace the following lines: A survey of the primary and secondary wood-using industries to determine the possibility of more complete utilization of by-products, low-grade material, and wood waste; dimension stock study, including the standardization of small dimension stock requirements and determination of the most economical methods of converting the standing tree into the form of material required in secondary wood-using industries; standardization of nomenclature, sizes, grades, and specifications for lumber and cross-ties; wood waste exchange to effect the utilization of raw material now disposed of as

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waste by supplying a medium through which producers can locate markets for woods, mill and factory by-products and waste, and wood-consuming plants can locate material of this character such as will meet their requirements; general work, including the broad field of encouraging the wider use in the wood using industries of the results of technical research available at the laboratory.

The proposed personnel of the new section, partly recruited from other laboratory sections, will consist of 10 technical foresters, 1 engineer, and 4 nontechnical employees.

UNIVERSITY OF CALIFORNIA SCHOOL OF FORESTRY.

Fourteen juniors and seniors of the University of California School of Forestry have returned from Califest Camp on the Plumas National Forest, where they have been engaged in the varied work of the summer course. Professor Metcalf, Professor Bruce and Professor Fritz were in charge.

Many improvements in the camp accommodations were completed during the year, the most notable being the swimming pool, which the boys built themselves.

Evening meetings before a roaring camp fire were held at frequent intervals. District Forester Redington, Supervisor D. N. Rogers, Lumberman Ray Orr and Professor Walter Mulford were among the guests entertained at these meetings.

Professor Fritz has been conducting a field study of utilization and waste in the Redwood region this summer.

Professor Metcalf has recently returned from a trip to Whitaker's Forest in Tulare County for remeasurement of sample plots of *Sequoia gigantea* second growth.

Professor Bruce leaves shortly for an inspection of the Redwood region with Forest Examiner S. B. Show.

Professor D. T. Mason left the faculty in May to open a consulting office in Portland.

THE RANGER CONGRATULATED.

In congratulating the editors of *The Ranger*, Forsythe Sherfese, Forestry Adviser to the Chinese Government, says: "The publication reflects great credit upon the spirit and ability of all concerned in its preparation, and it is my earnest hope and belief that it will be of increasing value to the entire personnel of the Bureau—and to the cause of forest Conservation in the Philippines".

With the third number of *The Ranger*, published monthly by the Filipino Rangers' Association before him, the editor of *American Forestry* heartily concurs with Mr. Sherfese's expressions.

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ATTENTION, FORESTERS

AMERICAN FORESTRY will print, free of charge in this column, advertisements of foresters wanting positions, or of persons having employment to offer foresters. This privilege is also extended to 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.

POSITIONS WANTED

EX-SERVICE MAN; age 30; married; two and one-half years in forestry college; experienced in city forestry, nursery work, tree surgery, dynamiting and in handling men; wishes position in city forestry or park department any where in northeastern United States. Now employed. Address Box 3025, care AMERICAN FORESTRY MAGAZINE, Washington, D. C. (10-12-21)

WINTER POSITION wanted with lumber company as time keeper or similar work. Graduate of high school and ranger course, 25 years old, good references from previous employers. Address Box 3030, care AMERICAN FORESTRY MAGAZINE, Washington, D. C. (10-12-21)

POSITION WANTED BY FORESTER. A healthy United States citizen, 36 years old, actively engaged in logging in equatorial America, where he has done considerable practical and scientific pioneer work, now wants to return to work under more civilized and progressive conditions. Has 12 years' bush and mill experience. He works best where difficulties and problems are greatest. He is a practical enthusiast for constructive and reconstructive forestry, and desires to make connection with a body recognizing said qualities. Address Box 2090, care of American Forestry Magazine, Washington, D. C. (6-8-21).

EX-SERVICE MAN wishes employment with some Forest Construction Concern or Irrigation Company which can use a young man who is a Technical High School Graduate, and who is a Mechanical Draftsman with some slight knowledge of plane surveying. Willing to work and can do same. Address Box 2096, AMERICAN FORESTRY MAGAZINE, Washington, D. C. (6-8-21)

CAN YOU USE ABILITY?—Young man, technically trained with master's degree in forestry desires position of responsibility with some lumber or forest products company. Fifteen months experience. Address Box 212, Lockhart, Alabama. (8-10-21).

POSITION WANTED as City Forester or Park Superintendent. Have had practical experience as Manager of Private Estates and have been 14 years in present position as Park Superintendent. Desirous of making a change at this time. Address Box 3005, care of AMERICAN FORESTRY, Washington, D. C. (9-11-21)

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POSITION of Secretary-Treasurer of Forest Protective Association of Timberland Owners open. Duties will be to conduct correspondence, keep accounts, canvass for new members, work out publicity campaigns, etc. Applicants should state salary desired. Address Box 550, in care AMERICAN FORESTRY, Washington, D. C.

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W. A. MORROW.

"I must say that you have made the magazine very attractive, not only from the viewpoint of forestry, which I naturally would be interested in, being in the lumber business, but also in other scientific research information, which is instructive and interesting. I congratulate you upon this forward stride and feel sure that it is appreciated by your subscribers."

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MRS. ALGERNON B. ROBERTS.

FORESTERS IN PAPER INDUSTRY

THAT forestry has advanced in the last fifteen years from a mission to a recognized profession is in no way better evidenced than by the manner in which the paper industry has provided positions in its organizations for the technical forester," says O. M. Porter, Assistant Secretary of the American Paper and Pulp Association. "There are now so many foresters engaged professionally by paper companies," he says, "that there is a special department, the Woodlands Section, in the American Paper and Pulp Association, composed of foresters and woods superintendents of paper companies and the executive secretary of the Association itself, Dr. Hugh P. Baker, is a Yale Forest School alumnus. These foresters are carrying into this great industry, both in the United States and Canada, their profession by practicing it, and I am proud to say that they are recognized as delivering the goods so effectively that their methods, once regarded by practical woodsmen as fanciful theories, are now recognized as making a profit for their employers."

AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

WASHINGTON, D. C.

PERCIVAL SHELDON RIDSDALE, Editor

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NOVEMBER, 1921

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FOREST FIRE

I saw this:—

It was the Inferno of Dante:
But ten times worse.
More horrible; more wildly beautiful.

There was a Valley, deep, rough and jagged.
On its sides, struggling for their places,
Were pine trees—ancient, gaunt and gray.

It climbed to their black boughs,
Even to the summits,
And there it feasted.

On the crest of the Valley, Man stood
Gazing down . . . terrified.
He could not move.
His eyes, bulged with fear, followed the dancing
flames upward



It was Night.

Above the Valley, like a fog on a day of damp,
There lingered a cloud—
Delicately pink, and changing with the minutes.
In the Valley, all was flame.
It lapped the scrubby grass, devoured the
scraggy bushes,
But coming to the pines, softly caressed them;
Until, in a moment of madness,

Until above the cloud of pink,
They were lost in blackness.

Once a lullaby, the murmur of the flames became
a cry—
Like the clarion notes of a trumpet triumphant.

The Valley was—the Inferno.
The Inferno was—the End.
I saw and heard all this.

—E. LIONEL FINCH.

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FOREST FIRES—A NATIONAL PROBLEM

BY WALLACE HUTCHINSON

AS national prosperity is ravaged at times by economic waste, so forests are ravaged by fire. The red plague of conflagration, which has been long present in our fair land, has left its sinister effects on every state and every community.

But the day of reckoning is close at hand. America's vast natural forests, exploited with lavish indifference and left unprotected without thought of the morrow, are nearing a point of exhaustion which spells disaster if the rate of cutting and burning is not summarily checked. Particularly disquieting is the fact that there is a steadily increasing cost to practically every product into which wood enters, from the humblest cottage to the great industrial plants, and from plow handles to print paper. This burden is shared in common by the people of all America.

The virgin forest area of the United States, experts say, was not less than 822 million acres, bearing a stand

of something like 5,200 billion feet of as fine timber as ever grew. Only two-fifths of this original supply remains, and our forest lands have been reduced nearly 50 per cent in acreage. But this is not all of the sad story.



THE FOREST PRIMEVAL

The finest forest timber in the world was the heritage of the American people. On it the prosperity of the Nation has been built.

of something like 5,200 billion feet of as fine timber as ever grew. Only two-fifths of this original supply remains, and our forest lands have been reduced nearly 50 per cent in acreage. But this is not all of the sad story.

Taking stock of our forest resources today, we find that 81 million acres—an area nearly as large as the combined states of Ohio, Indiana and Illinois, are an unproductive waste, which together with the lands partially stocked with young growth constitute an area of over 214 million acres of potential forest land that no longer bears useful timber. Why don't they? A large part of the answer is F-I-R-E.

A situation of this kind appeals to the imagination with peculiar force.

It is easy to picture hypothetical happenings that might follow in the trail of the flames.

If the United States was a private corporation dealing in natural resources on a large scale, it would receive once a year a bill reading something like this:

The United States of America,
TO VULCAN, GOD OF FIRE (Forest and
Otherwise), Dr.

Jan. 1	For 33,000 forest fires	
to	covering 12,000,000	
Dec. 31	acres	\$20,000,000

Received Payment,

V.

No business could stand such a yearly drain on its resources without facing financial ruin, and that is just what our own country is headed for, as far as forests and timber supply are concerned, unless our legislators and citizens wake up to the fact that the nation's fire problem is in urgent demand of immediate solution.

The Federal Government, in its National Forests at least, has faced the problem squarely and is in a fair way of solving it. The protection of 156 million acres of forest land, much of which is in mountainous and

remote regions, is a Herculean job in itself, and no one knows this better than the United States Forest Service. Therefore, it has set about carefully and painstakingly to work out a protection system that will be, from the very ground up, as nearly "fire-proof" as is possible to devise. Experience is an excellent teacher, and forest officers have had ample opportunity these last few years to learn many a hard-earned lesson in the fire game.

The workings of this fire-fighting organization, which is without doubt one of the most efficient in the world in the combating of forest fires, is worthy of note. The nucleus around which the fire force is organized is the permanent force of 2,000 administrative officers, supervisors, rangers, and forest guards on the National Forests. The more experienced of these men direct the fighting, furnish tools, subsistence and transportation to fire crews, pay off the laborers, and, in short, have general supervision over all forest protective measures within their local jurisdiction.

In all National Forests—and there are 147 of them scattered from Atlantic to Pacific and from Gulf to Bor-



HILLS CLOTHED WITH VERDURE, FAIR TO SEE

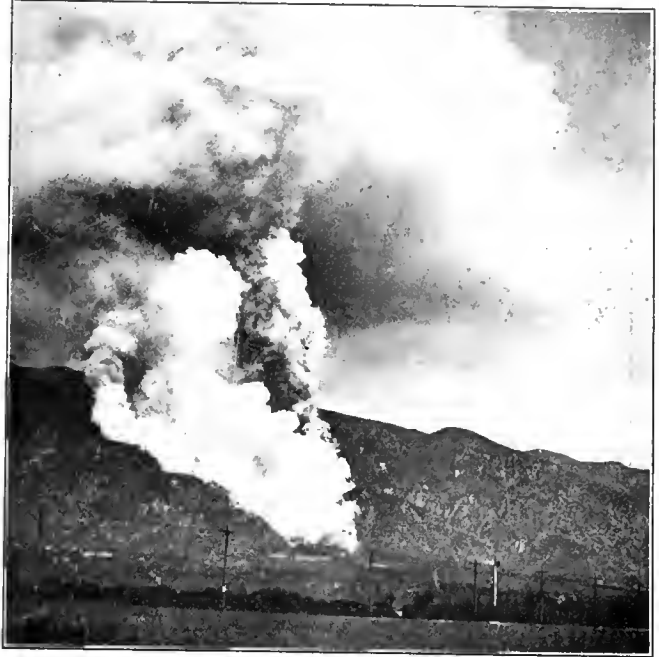
The virgin forest area of the United States was eight hundred and twenty-two million acres. Today there remains but 50 per cent of this total forest area. An ugly fact, but a fact nevertheless.

der, with two in Alaska and another in Porto Rico—an inventory of every possible source of fire danger is first made; then an inventory of the resources available to combat them. Preventive measures, such as the establishment of aerial and ground patrol, lookout stations, and public education in the right use of fire, together with such protective measures as cleared fire lanes, burning of dangerous slash, establishment of lines of communication, etc., are then put into effect.

The prime requisite in successful fire fighting, anywhere and everywhere, is an intimate knowledge of the lay of the land, an adequate detection and communication system, and arrangements perfected in advance for handling any fires that occur. The ranger and supervisory force of the National Forests furnish the first; airplanes, lookout stations, patrolmen, roads, trails and telephone lines the second; and the systematic and well laid fire plans of the Forest Service the third.

Fire seasons occur at different times of the year in the

employed; central employment and distributing agencies established; and the co-operation of the public enlisted. Beyond this point, human ingenuity and effort count for little, and local weather and fire conditions play a large part in the final outcome of the season's effort.



A FIRE MAKING GOOD HEADWAY

The red plague of conflagration has left its sinister effect on every community.

The efficiency of any system or plan of work can be measured largely by the results secured. So it is with the Forest Service fire-fighting organization. Let the figures speak for themselves. In 1920 there was a total of 6,078 forest fires in the National Forests. Of these, 80 per cent were discovered and extinguished by forest officers before they burned over an area of 10 acres each. A total of 342,193 acres of timber and open land were burned, or .2 of 1 per cent of the area included within all the Forests. The damage reported amounted to \$400,000, and approximately \$1,000,000 was expended in extinguishing the fires.

The preservation of our forests means not only protection to the lumber and pulpwood industries, and to watersheds so vital to the power and water resources of the country, but it means the safeguarding of the very essential of happy home life and business prosperity of every citizen. Today wood is not nearly as plentiful as it was a decade ago, and should it become more scarce in time to come the result will be a readjustment of the present high economic standards of living. When we stop to think that 50 per cent of the remaining forests of the United States are in the three Pacific Coast States of Oregon, Washington and California, the need for adequate protection of these timber resources is plain to every one. It is, therefore, of interest to note the latest experiments in the protective service covering this par-



FIGHTING THE RED ENEMY

The National Forests—first line of defense—the Ranger and his crew on the fire line.

various National Forests of the country, but no matter when the period of greatest hazard may be, preparation is made long in advance to combat the arch enemy of the forest. Lists of men, horses, automobiles, and supplies and equipment are worked up; aerial patrol is started; lookout stations are manned; extra patrolmen



A SMOULDERING GROUND-FIRE

"A little fire is quickly trodden out,
Which, if suffered, rivers cannot quench."

ticular region—the airplane forest patrol.

This year the aerial fire patrol, maintained by the Air Service of the U. S. Army, in cooperation with the Forest Service, enters into its third engagement. During the season of 1920 airplane patrol was maintained over the National Forests and Parks of the Pacific Coast from southern California to northern Oregon. From six base stations airplanes made a total of 1,301 patrols, spending 3,996 hours in the air and covering the tremendous distance of 476,085 miles. Flying at an altitude of from 10,000 to 15,000 feet, the airplane observers discovered 1,632 forest fires, of which 741 were reported to ground stations by radio, and the remainder by parachute messages or on landing. The percentage of accuracy, on the basis of 100 per cent for fires reported within one-fourth mile of their exact location, was 80 per cent. Thirty-seven airplanes were used for patrol and the personnel of officers, pilots, observers and mechanics numbered 220.

Aerial patrol, although spectacular in its methods, falls short of solving the fire detection problem. Of the forest fires discovered by airplane observers last year on the National Forests of the Pacific Coast, only 26 were reported to officers of the individual Forests concerned before similar reports had been received from lookout stations, patrolmen or other ground sources. It is expected to better this record during the present season through improved radio and ground-line communication. But the main reason why airplane patrol fails in effectiveness is because it does not afford a means of continuous observation. Any given point or part of a forest, to be fully protected from fire hazard, must be under constant observation

during the entire daylight period, which in summer time amounts to some 15 or 16 hours. Airplanes on patrol duty are able to make only two flights of from two to three hours each a day, going out over a regular



A REPRODUCTION AREA

If our idle forest lands could be put to work growing trees, and fire kept out, they would produce all the timber that the country needs.

route in the morning and returning in the afternoon. Since the machines travel at high rates of speed and cover great distances, the maximum time any part of a forest is under observation is roughly one-half hour during each flight, or a total of one hour per day. Therefore, for the remainder of the day there is no detection system in operation should a fire break out. The experiments made to date by the Forest Service indicate that aerial patrol will, probably, never supplant the ordinary means of fire detection now in common use. To the extent that it proves valuable it will serve as an adjunct, and under special conditions.

Let us now turn to a brief consideration of the forest fire losses of the whole United States, concerning which some interesting as well as startling statistics have re-

largely to the catastrophe of 1918, where, in addition to growing timber destroyed and towns and settlers' homes burned, nearly a thousand persons lost their lives by fire or suffocation.

A study of the figures which shows the acreage burned over by States reveals some interesting facts. Here we find six states, which have been more or less backward in forestry legislation, leading the list. According to the records, Louisiana, Florida, Georgia, Mississippi, Arkansas, and Alabama, in the order named, had a total of no less than 48,783 forest fires in five years; Georgia alone had over 20,000 fires. These burned over some 38,743,000 acres, or 56 per cent of the total fire-swept area of the United States. The damage wrought amounted to over 17¼ million dollars. Of these several States



A BARREN, UNPRODUCTIVE WASTE

It is appalling to think that eighty-one million acres of our country—an area as large as the combined states of Ohio, Indiana and Illinois—are an unproductive waste such as this.

cently been compiled. Even a cursory glance at the following figures will show how great is the need of adequate provisions for the safeguarding and renewal of our forests, and of what vital importance this problem is to the welfare of the nation.

During the past five years, or from 1916 to 1920, inclusive, the total loss from forest fires in 45 states, including National Forests, was more than \$85,000,000. A stretch of country considerably greater than that covered by all the New England States, or the State of Utah in the West, was devastated by fire. To be exact, 56,488,000 acres were burned over. The total number of forest fires during the five-year period was 160,000. Minnesota, with total damage figures of \$30,895,868, leads all States in monetary loss. This, however, was due

Louisiana alone has taken official cognizance of the forest fire evil and has provided for a fire protection organization. The work of this organization has thus far consisted largely in finding out the real extent of forest fire damage. This activity doubtless accounts for Louisiana leading all those States in the extent of its losses reported. There is food for much thought in these data, especially for the legislators, lumbermen, and citizens of all these southern States.

It is almost unbelievable that of the 160,000 forest fires that have occurred in this country since 1915, 80 per cent were caused by man, and were, therefore, preventable. Among the human agencies that were responsible for the greater number of these fires may be listed campers, railroads, brush burners, lumbermen, and in-

cendiaries. *Carelessness* was the cause of most of them, and this emphasizes all the more the need for widespread public education in the proper use of fire, especially when in the woods. This is a movement to which every man, woman and child in America should lend his best efforts and willing, whole-hearted cooperation, and it will take something more than passive cooperation at that.

The fire problem is one which also requires concerted action by the Federal and State governments to do the things which must be done by public agencies. Today, through cooperation with the Forest Service, 27 States

Federal allotment for that State.

4. Fire protection by the State must not only include merchantable timber, but also cut-over land and young growth; in short, must cover all classes of forest land.

On this basis, there are still 15 States, with a total of 175,000,000 acres of timbered land, which have taken little or no action in forest fire prevention matters, and are, therefore, not eligible to receive Federal aid. These are Alabama, Arizona, Arkansas, Colorado, Delaware, Florida, Georgia, Indiana, Kentucky, Mississippi, Missouri, Illinois, Oklahoma, South Carolina, and Wyoming. Lack of public sentiment for organized control of forest



THE TRAGIC AFTERMATH—LOSS INCALCULABLE

During the past five years the total loss from forest fires in 45 states was more than \$85,000,000, and an area of 56,488,000 acres was burned over.

are receiving Federal funds for the protection of their forest lands. Over 150 million acres of the principal timber regions of the country are thus being guarded against devastation by fire. The limitations governing Federal aid in fire protection under the so-called "Weeks Law," which was originally passed by Congress in 1911, are:

1. It is only extended to States that have provided by law for a system of fire protection.
2. It is limited to the watersheds of navigable streams.
3. The State must expend an amount equal to the

fires is prevalent in many of these States; in others, fire prevention legislation has been pending for a number of years without favorable action. Probably nowhere in the United States is education on the evils resulting from uncontrolled forest fires as badly needed as among the citizens of the South.

But the South is not the only part of the country that should be awakened to the importance of this present-day problem. While there are now several States which are protecting a part of their forests equally well with the Forest Service, or even more efficiently, nevertheless,



(Courtesy U. S. Air Service)

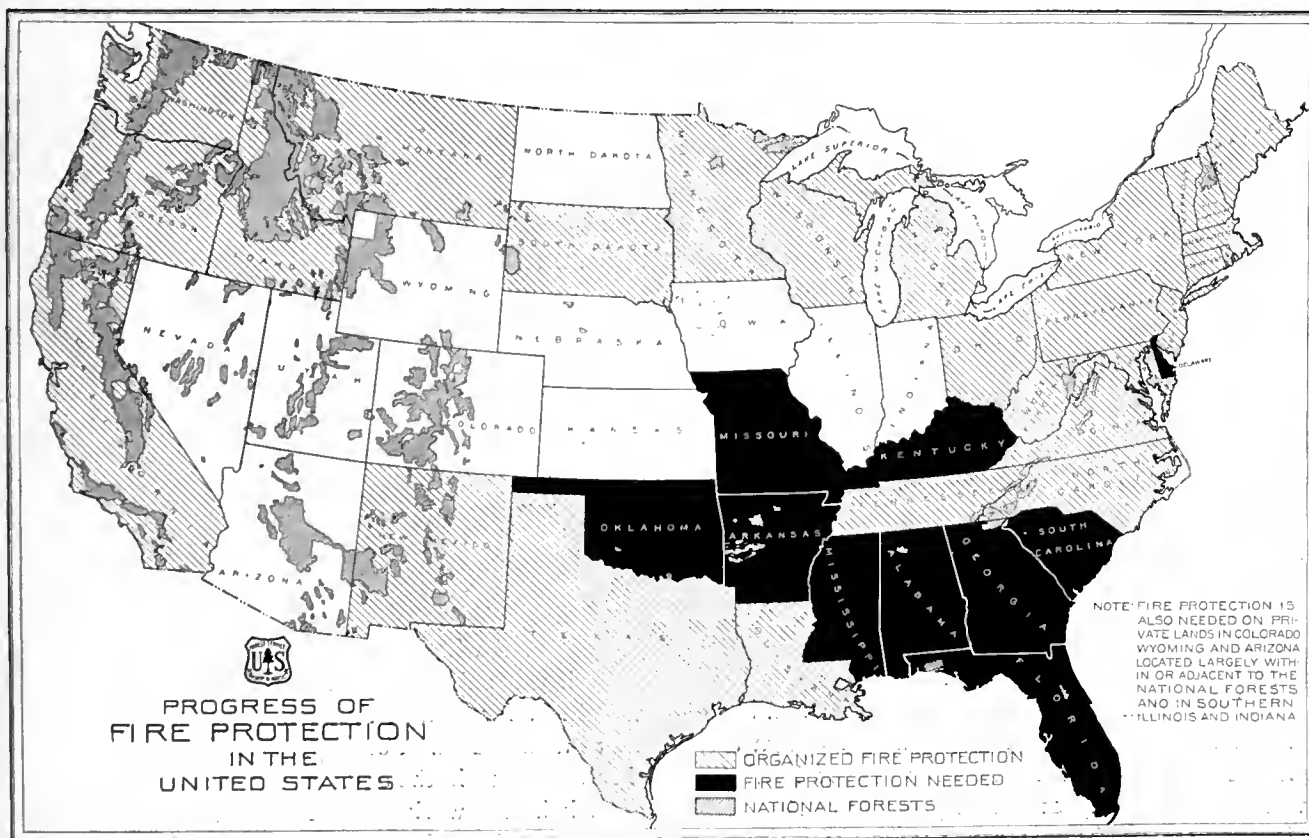
COOPERATION IN FIRE CONTROL FROM THE AIR

Flying at an altitude of from 10,000 to 15,000 feet, the airplane patrol on the Pacific Coast last year "spotted" 1632 forest fires and rendered invaluable assistance to the Forest Service.

there is hardly a State in the Union that can boast of having attained adequate protection standards, and many more are very far from it. Yet every State has some kind of forest fire laws among its statutes, and 33 of them have passed legislation calling for greater or less activities along forestry lines, but not necessarily fire protection. During the last year, however, the law makers in many States have awakened to the fact that fire and the forestry problem are national matters in which every

commonwealth, regardless of whether it produces timber or not, is vitally interested.

Our forestry problem is national in scope because it has to do with a product of the land that is essential to all business development. It is out of the question to think of making all timbered lands over into Federal National Forests, because of the large holdings already in private ownership. On the other hand, we will fall far short of the mark if the matter of timber production is left en-



tirely in the hands of the lumbermen. People at large and the private owners of timberland must sit on the game and help the States and National government carry the burden.

There are a number of essential things to be done if this country is ever to have a standard policy of timber production. First, we should have a complete survey of our timber resources—a stock taking, if you please—so as to find out our forest assets and determine what land should be permanently retained for timber production. Second, the Government, States, and private owners, working in cooperation, must establish standard systems of fire protection and reforestation, since largely on these two prime factors will rest the success of the whole movement. Third, the States, with the aid of the Federal Government, must work out a more equitable

have not yet learned the solution. The fact that forests enter into the daily cost of living, and are part and parcel of the industrial prosperity of the nation, has never occurred to them. How to carry the message of forestry in an impressive way to such people is one of the big problems of the day.

New Jersey made a start along these lines not long ago by providing for the compulsory teaching of fire prevention in its public schools, so that every child, at least, will know something of the danger from fire and the care necessary in its use. Other States have been working along similar lines, and this year compulsory fire teaching laws were passed by California, West Virginia, and Rhode Island. The New York legislature also passed a similar bill, only to have it vetoed by the Governor. The outlook in many of the other States is not very prom-



(Courtesy U. S. Air Service)

THE EYES OF THE FOREST

The airplane fire patrol in action. This is the third year of cooperation between the Air Service of the U. S. Army and the Forest Service and while aerial patrol does not solve the fire detection problem, it is a powerful help and its effectiveness in this respect will be increased through the improvement of radio and ground line communication.

system of forest land taxation than is now in effect. Fourth, the existing National Forests should be extended through purchase, land exchange, or Presidential proclamation to include large timbered areas now outside their boundaries. Fifth, the States must pass forestry laws to provide for carrying out their part of the whole economic plan. Sixth, all agencies must lend their best efforts toward public instruction in the forestry problems confronting the nation.

Education in forestry is one of the crying needs at the present time. Millions of our people know nothing of the timber resources of the country, other than that there is a lumber yard around the corner, and care less. The high price and scarcity of building material, newsprint, etc., is a mystery to them—a new problem of which they

are not yet sufficiently aroused to demand such legislation, it will get it.

This year the proclamation of Forest Protection Week by President Harding, did much to awaken public interest. In 19 States, local proclamations were issued by the Governors in response to the President's appeal. A large amount of space was given the subject of forestry by the daily press, and in many cities and towns the week was observed with appropriate ceremonies. But, by and large, it was only a drop in the bucket—something to be thought of for a short time and then forgotten. This is not as it should be. Forest protection should be a matter of conversation in the office, at the club, and in the home. Until it is, the work ahead for all those who have conservation at heart looms large.



THE EXPLOITATION OF THE FOREST

America's vast forests, exploited with lavish indifference and left unprotected without thought of the morrow, are nearing a point of exhaustion which spells disaster.

It has been repeatedly said that the kernel of the whole forestry problem is fire protection. What use to talk about the conservative cutting of timber, or of reforestation, unless we first provide adequate preventive measures against fires? If our idle forest lands could be put to work growing trees, and fire kept out, they would produce all the timber that the country needs. Instead, we go merrily on our way, allowing the waste lands to be

devastated, and using what little timber we have left faster than it is being replaced by new growth. In so doing, we are not only damaging the present, but literally burning up the future.

"What of it?" You may never know the answer, but your children and your children's children will some day most surely pay the price for the present extravagance and waste of natural resources by the American people.

(Photographs not otherwise credited through the courtesy of the U. S. Forest Service)

O MAN!

The tree had grown for a hundred years
Shading the grateful soil
A man cut it down in half a day
And groaned because of his toil.

The coal slept long in the earth's dark depths
Covered with fern and flower
A man dug it out with the stroke of a pick
And burned it all in an hour.

The oil lay hid in its deep down well
Gift of the Pliocene past
A man used it up in the wink of an eye
To run his auto fast!

O merciless man with the gifts of the gods—
And this means you and me—
If you stay not your hand from its careless course
What will the harvest be?

DON C. SEITZ

DR. SARGENT'S CONTRIBUTION TO FORESTRY IN AMERICA

BY HENRY S. GRAVES

HISTORY has demonstrated in the United States, as in other countries, that the establishment of forestry is a process of many years of development. Much of what we have achieved is the result of foundations laid from thirty to forty years ago by men of vision and strength who instituted the first fight against the destruction of our forests. The history of forestry is not so long but that some of the early pioneers of the movement are still actively contributing to the work in a way that is possible only by those of wide knowledge and rich experience. Conspicuous among these leaders is Dr. Charles Sprague Sargent, who exerted a powerful influence on the initiation of the forestry movement in the early days, who was responsible for a number of epochal steps in forestry, and who is the foremost American scholar in forest botany and arboriculture and the builder of a great arboretum that is unmatched anywhere. His scientific contribution to forestry and his personal influence on the movement will be increasingly appreciated as the years go by.

Forestry had its real beginnings in the seventies. The progressive depletion of many of the more accessible sources of timber supply caused a wide discussion of forestry in the East. About the same time the rapid settlement of the prairies was taking place, and the homesteaders were finding themselves greatly embarrassed by the lack of lumber and other material needed on the farm, a situation due to the fact that the great forests of the Lake States had not yet been opened up and there were still lacking transportation facilities to distribute readily and cheaply such lumber as was obtainable. These conditions explain the agitation in forestry and especially for the planting of trees at that period. No less than sixteen states enacted legislation for the encouragement of tree planting about that time, and in 1873 Congress passed the so-called Timber Culture Act, whose purpose was to bring about the establishment of plantations of trees on the plains. One important educational influence was the action of the American Association for the Advancement of Science in 1873, which memorialized Congress and the State legislatures on the subject of forestry, and specifically recommended the appointment by Congress of a competent commission of inquiry. This action resulted in a great deal of discussion of the subject and was responsible for the federal appropriation that enabled Dr. F. B. Hough to make his special reports to the Commissioner of Agriculture from 1877 to 1882.

The first action of importance by the Federal Government, however, was the authorization of a special study of the forests of the country in connection with the tenth Census in 1880. This work was delegated to Dr. Sargent. The results of his study were presented in a monumental work for which an entire separate volume

of the Census was devoted. There is in this work a comprehensive description of the forests of the country, a survey of the situation with reference to existing supplies of standing timber, the facts regarding the forest industries, a statement regarding the destruction of forests by fires, and a summary of the existing information concerning the character and quality of the different commercial woods. This was the first important effort to bring together in available form the facts in regard to our forests. It provided for the first time an economic background for the consideration of the needs of the country for forestry. For many years it furnished the chief source of data for educating the people of the country to the need of action. In fact, no attempt was made to supplement this work in any large way until 1908, when a large amount of information based upon existing conditions was assembled by the National Conservation Commission appointed by President Roosevelt. The influence of the work of Dr. Sargent through his report for the tenth Census was very far-reaching and greater than can be measured.

In connection with this work for the tenth Census Dr. Sargent brought together a noteworthy collection of specimens of the woods of the United States. This was made possible through the generosity of Mr. Morris K. Jesup of New York who provided the necessary funds. The specimens were in the form of sections of tree trunks of typical size, showing the character of the bark and with a portion of each section cut in a way to illustrate the grain of the wood. The collection is now in the Museum of Natural History of New York. So far as I know there is no other collection of wood specimens equal to it anywhere in the world.

One of the outstanding accomplishments in forestry has been the building up of the State Forest Preserve in New York. We have that splendid undertaking today because of the foresight of public spirited men nearly forty years ago. At that time the State owned in the Adirondacks and Catskills something over 700,000 acres of forest land. These State lands, which were entirely without protection, were the object of extensive stealing of timber, were in many cases being swept by forest fires, and were also subject to numerous fraudulent transactions through the misuse of the laws relating to tax redemptious and cancellations. It became generally known in 1883 that the Adirondack Railroad Company contemplated the extension of its lines into the heart of the wilderness in order to exploit the timber on its extensive holdings. This property comprised 500,000 acres and about twenty years before had been granted to the predecessors of the Adirondack Railroad Company for five cents an acre. The proposal to exploit this great tract and to bring the railroad into it, which would expose the whole region to damage by forest fires, caused



From a drawing by John S. Sargent

Dr. Charles Sprague Sargent

great public anxiety. A popular campaign was conducted under the leadership of the Chamber of Commerce of New York to secure State action to save the Adirondack forests. The State legislature had appointed a committee of three men to reach some conclusion in regard to the Adirondack problem, but little headway was made on account of the lack of expert counsel. Accordingly in 1884 a commission of experts was authorized by the legislature to study the situation and to make recommendations. Dr. Sargent was appointed chairman of this commission. His report submitted in the following year contained recommendations in regard to the establishment of a definite forest policy for the State. The bill accompanying the report was the basis for the law of 1885 which established a State Forest Preserve, authorized the appointment of a forest commission, and contained other features of State policy upon which the whole system of forestry in New York has been constructed.

The Arnold Arboretum at Harvard University was established in 1872. Dr. Sargent has been its director since that time. His position at the head of this institution afforded him an opportunity to take the lead in forestry in many ways that have counted large in influence during the whole period of its existence. Repeatedly he was called upon to render public service both in State and national matters. Among his early contributions were his reports in 1875 and 1878 to the Massachusetts State Board of Agriculture on the planting of trees, supplemented by additional information in subsequent years. One of the most important instruments of education in forestry used by him was *Garden and Forest*, a magazine published under his immediate direction, organized in 1887 and continued for ten years. This magazine was primarily designed to promote the interests of forestry and landscape gardening. On the side of forestry it contained a wealth of interesting material. A student of forest history can obtain in these ten volumes better than anywhere else a conception of the incidents of importance in the forest movement during that period. By articles and editorials the different public questions relating to forestry were discussed and a strong position taken by the editor in regard to public policy. As early as 1889 *Garden and Forest* urged the need of adopting a definite national forest policy, with special reference to the handling of forest lands on the public domain. Specifically it urged the withdrawal of the public forests from further disposal to private individuals, their temporary patrol by the Army against forest fires and depredations, and the appointment of a competent commission to prepare a plan for the administration of the public properties. One finds in the editorial columns discussions in regard to a national park policy, the service of forests in watershed protection, the problems of forestry in New York State and elsewhere, the need of courses in forestry in our educational institutions, and many other subjects which today also are being discussed in our forest periodicals.

Within the last two years there has been initiated a nation-wide campaign to save a remnant of the great Rodwood forests in California. An association has been organized under the name of "Save the Redwoods League." Its purpose is to secure funds to acquire from private owners small groves along the State highway that runs near the coast through the Redwood belt, and to establish a number of public parks which shall remain for all time in their natural state. It is interesting to note that in 1897 Dr. Sargent proposed in an editorial in *Garden and Forest* the raising of \$500,000 for a similar purpose. In this appeal he said among other things:

"To those who have wandered among these mighty trees, built up by the slow growth of centuries, and felt the inspiration of their solemn beauty, the destruction of the Redwood forests seems to be a sacrilege which should not have been allowed, and certainly, if some small part of it is not preserved, a great wrong will be done to the world, which will lose, with the passing of the Redwoods, one of its fairest possessions."

The first step in a National Forest policy was taken in 1891. It will be recalled that certain of the old laws for the disposal of public lands had become obsolete or subject to abuse. An effort was made to revise the public land laws by the Act of March 3, 1891. In this Act the authority for the sale of public lands was abrogated, the troublesome Preemption and Timber Culture Acts were repealed, the Desert Land and Homestead Acts were modified, and various other changes made in the land system. The friends of forestry were able to secure the insertion in the new law of a clause granting to the President authority to set aside by proclamation portions of the public lands as forest reservations. It was this authority which laid the foundation for the present system of National Forests. The establishment of reservations proceeded, however, slowly and under many difficulties, largely due to the lack of the proper machinery for administering the forests and for making the necessary plans to extend the system. Dr. B. E. Fernow, Chief of the Division of Forestry in the Department of Agriculture, was taking an active leadership in bringing about a more efficient plan for administering the public forest problem. But he was handicapped because the jurisdiction over the forests rested with the Interior Department while he was attached to the Department of Agriculture. Sufficient interest in the question of public forests was aroused to induce Congress in 1896 to authorize the National Academy of Sciences to make an investigation and report "on the inauguration of a national forestry policy for the forested lands of the United States." A commission of seven men was appointed by the Academy with Dr. Sargent as chairman. An appropriation of \$25,000 was made by Congress which enabled the commission to visit the west during the summer of 1896 and to obtain a first hand view of the public forest problem. As a result of its report and in response to Dr. Sargent's recommendations, President Cleveland set aside new forest reservations

aggregating in area more than twenty-one million acres.

This action caused a storm of protest from the West and precipitated a controversy in Congress that put to test the sentiment of the country regarding the conservation of our public forests. This is not the place to discuss the many interesting incidents of that controversy or the excellent work of the different persons responsible for bringing about a settlement. Dr. Sargent himself played a prominent part in sustaining the policy of additional forest reserves. The proclamation setting aside the reserves was issued by President Cleveland just before the completion of his term of office. The pressure upon Mr. McKinley, the new President, to annul the action of his predecessor was very great. Shortly after President McKinley's inauguration the Commission of the National Academy of Sciences called upon him to discuss the situation, and afterwards Dr. Sargent himself had a long private interview with the President, with the result that the latter decided to take no action in the matter but to let the reserves stand. This was a critical point in the history of forestry, for at these conferences Mr. McKinley frankly stated that he had intended to return the reserves to public domain.

The controversy over the forest reserves set aside by President Cleveland resulted in the enactment of the Act of June 4, 1897, which provided for the administration and the uses of the public reserves. Thus was laid the real foundation for the system of National Forests which now aggregate more than one hundred and fifty million acres.

Dr. Sargent was also a prominent advocate of National Parks. His first proposal in regard to National Parks was in connection with the region included in the Glacier National Park. In 1882 and 1883 he had charge of the forest work of the Northern Trans-Continental Survey which was organized by Mr. Villard, President of the Northern Pacific Railroad, for the purpose of acquiring information about the resources tributary to the railroad. The most important expedition was that in 1883 when Dr. Sargent was associated with Prof. Pompelly in a reconnaissance of Northern Montana. The glaciers were discovered at that time. After Dr. Sargent returned to the East he wrote an article in *The Nation* advocating that the glacier country should be made into a National Park be-

cause of its scenic grandeur. In the reports of the Forest Commission of the National Academy of Sciences, already referred to, recommendations were made for the establishment of two National Parks, one to include Mt. Rainier in the State of Washington, and the other the Grand Canyon of Arizona. Dr. Sargent's views regarding parks were further expressed in different issues of *Garden and Forest*. He was an ardent advocate of National Parks, but believed in their establishment only where there were unusual scenic features.

Since that time Dr. Sargent has devoted his efforts chiefly to his scientific work in the study of trees and other woody plants. His research has added greatly to the world's knowledge of forest botany. His most important published work, *The Silva of North America*, will always remain one of the great classics in botanical literature. His *Manual of the Trees of North America* is the handbook of every student of American forests, and his other publications, constituting a long list based upon studies made throughout the world, enrich our knowledge of trees.

Dr. Sargent has already erected a great monument to his scientific work in building up the Arnold Arboretum. It was the original purpose to have at the Arboretum specimens of every tree and shrub capable of growing in the climate of eastern Massachusetts. During nearly fifty years of careful experiment Dr. Sargent has already gone far in carrying out this plan. Upon the two hundred and forty acres at his disposal, he has planted thousands of specimens of trees and shrubs both of native and foreign species. The student can find at the Arnold Arboretum one of the best special libraries on forest botany in existence, an herbarium equally rich, and a collection of living specimens of the trees and shrubs that shows their adaptability to the local climate and their natural habits of life and growth. Students come to the Arboretum from many parts of the world. In many cases they find the trees of their own country brought together in a way more advantageous for study than at home. As a piece of scientific work in one branch of forestry the Arnold Arboretum stands as the most thorough and most nearly complete of any that has been undertaken in the United States. It is of immeasurable importance in laying a sound scientific foundation for American forestry.

R. G. MERRITT, a technical forester for ten years associated with the United States Forest Service and more recently assistant secretary of the North Carolina Pine Association, has been appointed an assistant in the Natural Resources Production Department of the Chamber of Commerce of the United States, with headquarters in Washington, D. C. Mr. Merritt's activities with the Chamber have to do directly with the work of the

National Forestry Policy Committee. His work with the Forest Service took him into eight states in different sections of the country, and this wide experience, together with his training in lumber production and lumber association work, eminently fit Mr. Merritt for his present duties. He is a member of the American Forestry Association and a senior member of the Society of American Foresters.

WHAT IS FORESTRY ALL ABOUT?

BY THE OBSERVANT STENOGRAPHER

AS an innocent bystander I'm curious to know what all this forestry talk is about. Am I going to get hurt, and if so how and why? Must I take steps to protect myself, or will I be saved by grace of the national forest policy I hear talked about so much, with so little agreement as to what it should be.

Why is forestry anything to me anyway? As a citizen with a vote, I try to be interested in good government and public welfare, but I live in an apartment house in concrete-stone-brick and steel-ribbed New York, where wood is apparently not needed nor used. Yet I'm told that millions and millions of feet of lumber are used right here in the big city and that wood is indispensable to our civilization, with no adequate future supply in sight. I've usually sat in wooden chairs and prefer wooden tables to the marble slabs at Childs, but why should I have to go out and rustle lumber or grow a tree to get them any more than I have to raise a sheep or plant an acre of cotton to get a new suit?

In the office where my working hours are spent, the foresters and lumbermen who frequent it are continually talking about the timber supply and saving the forests. At times they get real excited and seem to be trying to save the country from something, and when it comes to that I think we all ought to help. They talk about a Snell Bill and a Capper Bill, but they don't mean much to me, except numerous trips to Washington for somebody—and I've never even been there—and hearings and conferences and a general haze. There are a lot of other things which seem much more pressing and important to me, such as helping the poor babies on the East Side, or doing something with or for the undigested foreigners to make them good Americans instead of half-baked Bolsheviki who won't even try to learn our language, but come over and board with us, then try to wreck the kitchen.

Of course, along with other things, we must do something to save the forests. Why, Aunt Jane has the most marvelous picture of a big tree in her front room. I'm sure it must be a redwood, because that's the only big tree I've ever heard of. And everybody says we oughtn't to cut any timber because if we do the whole country will look as flat and treeless as Broadway. A very practical sort of man, I think he owns a mill, asked me what we would do for lumber if we didn't cut down any more trees, when I told him about the picture and made the remark that "We must do something to save the forests," but I didn't even answer him, because he's probably one of those people who like to pick an argument.

With all this in mind, and thinking maybe I'm behind the times, I sometimes ask my friends, or people I meet in Jersey—which you know is one of the places where New York sleeps—what they think of the Snell Bill, and if they agree that a yield tax instead of the general property tax would be better for the forests. Well, you

should see them look at me. They don't say I should be committed to Mattewan, but I know they think it.

Then when I tell them we need a forest policy to provide wood for our children and everybody's children for generations hence, with some plan of paying for it so it won't cost anything, they ask what for will we need this wood, and isn't Jersey just covered with trees? Why on that picnic in the Jones' flivver Labor Day we had lunch under a clump of the finest scrub pine you ever saw, with lots of limbs down to just over our heads, so we didn't get wet in the shower and everything, and last summer, coming back from the shore one night we saw a beautiful fire running through the woods along the railroad. We should worry but its about father's income tax, and how to make last year's hat finish out the season.

So I wonder where is all the public sentiment the talk in the office made me expect to find. You would think from some of the remarks that forestry was the main thing talked about in the subway and on the Avenue, but I seem to have missed it. If people go home nights full of apprehension as to where their next board or spruce newspaper is coming from, they hide it mighty well. It certainly shows the wonderful control the American people have over themselves.

If it is all so important, one would think that each forestry enthusiast would tell his neighbors about it, and they would tell their neighbors, and soon everybody would be thinking and talking about the need of forest conservation and perhaps do something about it. This is what they should do if the subject is so big and urgent, and it must be vital to the country or to some one, and perhaps to me, or the handful of good men and and true would not be trying so hard to get a national awakening.

I've watched, too, in the papers and magazines for articles about it, and from the occasional things I've seen, the conclusion is that the lumber barons (in bold faced type with a spiked tail) are making a wanton, wilful waste of our beautiful forests, and for no purpose other than to see how much damage they can do while working for selfish, greedy gain. One would conclude from cartoons I've seen that you could always tell a lumberman by his loud checkered suit, big black cigar, and nine carat diamond stick pin, like they tell me barkeeps used to wear; yet the lumbermen I see in the office don't look like that, and from what I hear them say they are cutting lumber because people want to buy it (sometimes) to build homes with, and they are quite as anxious to make their timber go as far and last as long as those who do not own it. And I know, too, they have their troubles.

Since I'm trying to find out why I, as a personal matter, should get excited about a forest policy for U. S. A., I've also asked a lot of questions of the foresters who help

(Continued on page 716)

HEDGES OUT OF THE ORDINARY

BY LEWIS EDWIN THEISS

AT first glance there would seem to be very little connection between thrift and hedges, but a closer examination shows that our hedges may be the very essence of thrift. It depends entirely upon what they are made of. In any case, a hedge has to be cared for. A productive hedge will pay its own way, and perhaps net the owner a profit. An unproductive hedge is a liability pure and simple. The question for the householder to decide is whether he will have at least a portion of his hedge bringing in value, or whether he will have all of his hedge unproductive.

Commonly we have not thought of our hedges as revenue producers. But why should they not be? A productive hedge may be as beautiful as one that is purely ornamental, thus satisfying the esthetic instincts of the owner. The chances are that it will be more attractive than the merely ornamental hedge, because of the beauty of flower and fruit. And certainly there should be no comparison between the pleasure afforded by an unproductive hedge and one from which, year after year, the owner gathers products that have a tangible value in dollars and cents.

There is, however, a limit to the desirability of such a hedge. For planting along a highway a productive hedge would doubtless be undesirable. It would be an invitation to spoliation. The hedge would be damaged by

thieves, and consequently the owner of the hedge would be greatly annoyed. But for planting along a property division line, or for a hedge wholly within one's own property, or for mass plantings within the home plot, productive plants of various sorts may well be selected in preference to the usual ornamental hedge plants.

The privet and the barberry are probably the two most used hedge plants. Is the privet any more beautiful than the filbert, or the barberry lovelier than the common currant? Both of these productive plants make very attractive hedges.

Some years ago the writer dug up a currant bush that stood in his garden, as the space it occupied was needed for vegetables. The bush was utilized as material for a hedge to conceal a wood-pile. The plant was divided into a dozen or so pieces, which were planted at five foot intervals. Decaying chip-dirt from the wood-pile was thrown around them, and usually the bushes get a dose of lime-sulphur when the orchard is being sprayed. Otherwise they have had very little attention.

Fortunately the currant is one of the hardiest of plants, and even with no more care than these bushes have had, they thrive and produce well. The largest bushes yield five or six quarts each of fine currants annually, and the total crop from the little hedge last



HANDSOME LANDSCAPE EFFECT OF THE FILBERT HEDGE

This hedge lends itself splendidly to the use of the landscape artist in planning large grounds, is excellent along a drive or as a dividing line in sections of a garden. The European variety produces a splendid nut, and the harvest from such a hedge is a time of pleasure and profit to the owner.



A COMBINATION HEDGE TO SCREEN THE VEGETABLE GARDEN

Can you think of anything that would make a more effective screen than this hedge of peaches makes? Or a hedge more ornamental—and profitable—than this one will be when hung with ripe peaches?

spring totaled two and a half bushels. There is no difficulty in disposing of the surplus. In 1920 we sold nearly ten dollar's worth of currants.

Probably there is no plant that the home owner can raise more easily than the currant. The bushes can be propagated by cuttings, root division, and layering. Layering is the bending down of a pliant branch until it touches the earth. It should be pegged down at a node or joint, and earth should be heaped over the joint. Roots will shortly grow where the plant is covered, especially if a slight notch is made in the branch near the node and between it and the root. When the new plant is well established, it can be severed from the main bush. By layering, several plants can be propagated from one bush at the same time. Thus by the following spring the propagator should have a number of plants for setting out.

Root division is merely the severing of the roots into a number of pieces, each with at least one stem. A large bush can readily be divided into a considerable number of smaller plants.

Hardwood cuttings are merely pieces of the plant cut when dormant. All currants need to be pruned, and cuttings can be taken when the regular pruning is done. These should be at least six inches long and may profitably be longer. They should have about three buds. The cuttings should be kept cool and moist until spring. Wrapped in moist moss and put in a cool cellar, they will

keep perfectly until planting time in spring. Then they should be planted in the garden with the upper bud above ground, and be well cultivated. Roots will start, tops will grow, and shortly one will have thrifty little bushes that will be suitable for setting out in a year or two.

Given one plant, it is a very simple matter for the gardener to propagate as many new plants as he wishes and to have lots of pleasure in doing it. Thus, if one has it in mind to plant a currant hedge, one need not worry about the cost—unless it is necessary to have all the plants immediately. Select one each of the varieties desired, plant them in the garden, feed and cultivate them well, and propagate by layering and cuttings.

That is the way the writer is getting the bushes for a filbert hedge. Good filbert bushes of the European varieties, which are far the most desirable, cost perhaps one to three dollars each. A hedge of these bushes would be quite expensive if one were to buy all the bushes needed. Our proposed hedge will require scores of plants. We bought only two bushes, one each of two varieties. These are in a nursery row in the garden, where, by the methods already mentioned, we intend to produce as many plants as we need.

The European filbert bears a larger, better flavored nut than the native American filbert or hazelnut. Commercial nurserymen estimate that a mature filbert bush under proper cultivation will produce annually twenty

pounds of nuts. The bushes can be spaced five feet or so apart for hedge purposes. Even if this close planting cut the estimated production in half, no great number of bushes would be required to produce as many filberts as one family could possibly eat.

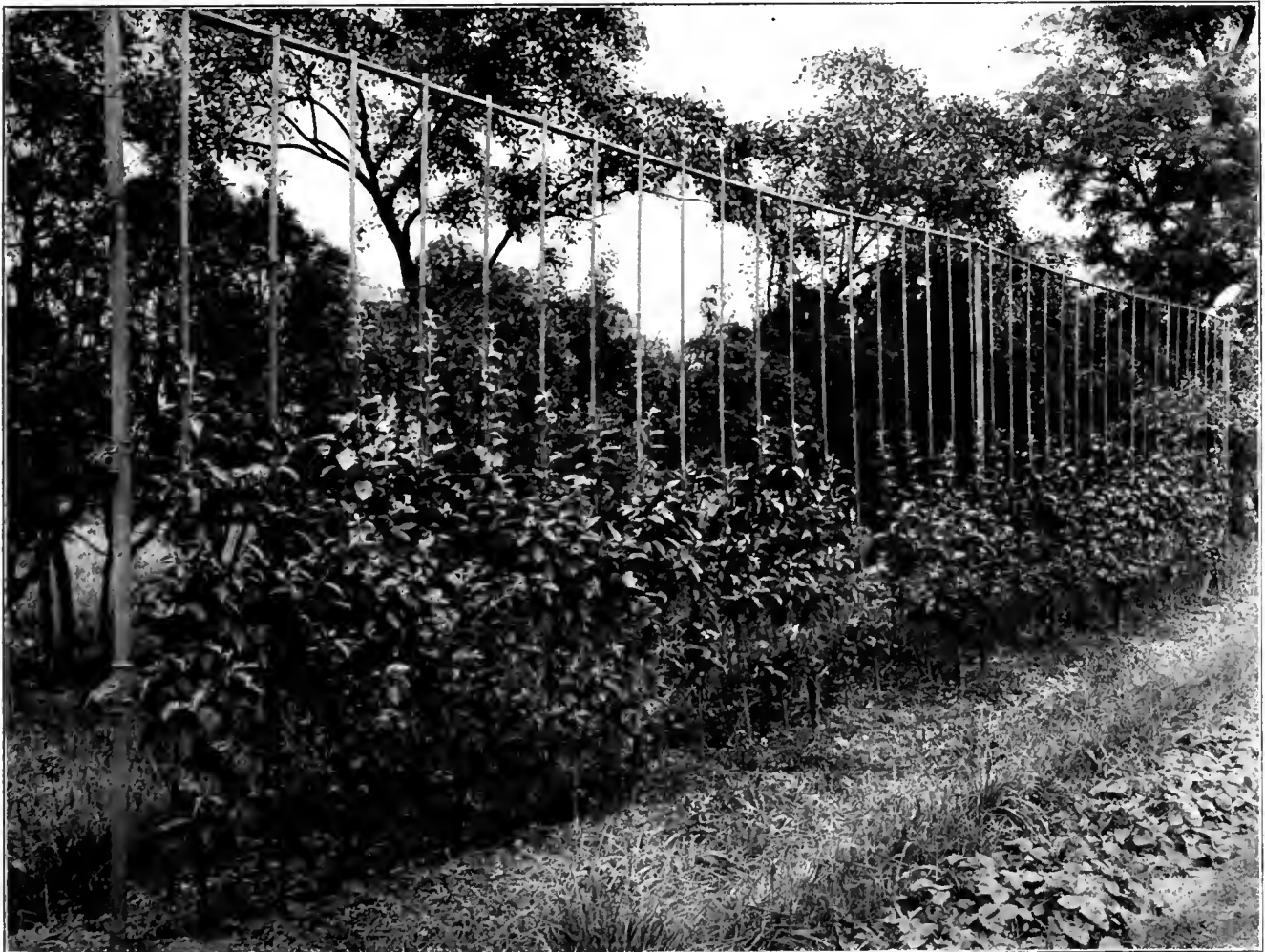
The filbert is one of our handsomest plants. The leaf is beautifully moulded, while the graceful catkins and rosette-like involucre that contain the nuts make the bush altogether artistic and desirable. The plant can be trained to grow like a little tree, but for hedge purposes it is better to make it grow bushy. It can be kept low by pruning, and pruning encourages the formation of fruit spurs. The native and the European varieties should never be planted together. The native plants sometimes suffer slightly from a disease that shortly kills the foreign varieties if it attacks them. Hence it is advisable never to plant them together.

The list of unusual hedge material by no means ends with the plants named. The gooseberry, for those who like that fruit, is every whit as desirable for hedges as currants are. Like the barberry, the gooseberry is armed with thorns, that help to repel marauders. The fruits are highly artistic, and even in winter the bare bushes are

attractive. Gooseberries can be propagated like currants. For mass plantings in odd corners any one of these three plants is entirely suitable.

A division line hedge of blackberries will prove to be a joyful surprise to those who plant one. Set rather closely, kept within bounds by pruning, and fastened to a trellis of parallel wires, the blackberry forms a hedge that is truly a thing of beauty and a joy forever. It is doubtful if nature has provided a plant that can give man more real enjoyment than the blackberry. In spring, when the buds are swelling, the air is heavy with a wonderful perfume that increases as the blooms open. Unless it be the perfume of the wild grape, there is hardly an odor in nature so alluring. The blossoms themselves are a showy sight. Then come the tiny, green berries that gradually expand, turn red, and finally become a shiny black. The beauty of the blackberry does not end with the maturing of the fruit. In fall the leaves turn such a wonderful bronze red that a blackberry branch is a thing of rare beauty. It can scarcely be equalled as a background for cut flowers.

Dwarf fruit trees are also available for use in hedge making. Perhaps the pear is as desirable for this pur-



THE BEGINNINGS OF A FINE FRUIT HEDGE

Showing clearly the method used in training the young fruit trees. These are young dwarf apples being trained into a hedge. The pliant young shoots will be fastened to the espalier wall so as to force them to grow in a vertical plane.

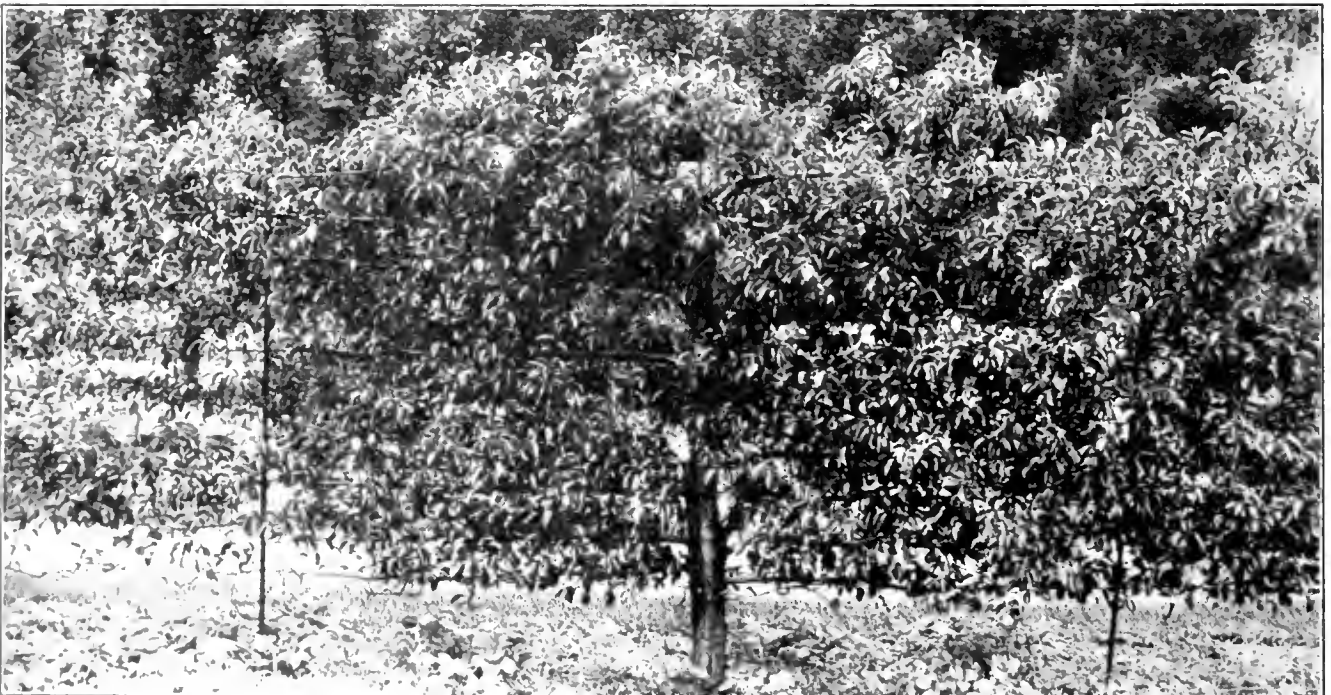


THE FILBERT HEDGE

Proving the contention that a productive hedge may be as beautiful as one that is purely ornamental. The decorative value of this handsome planting goes without saying.

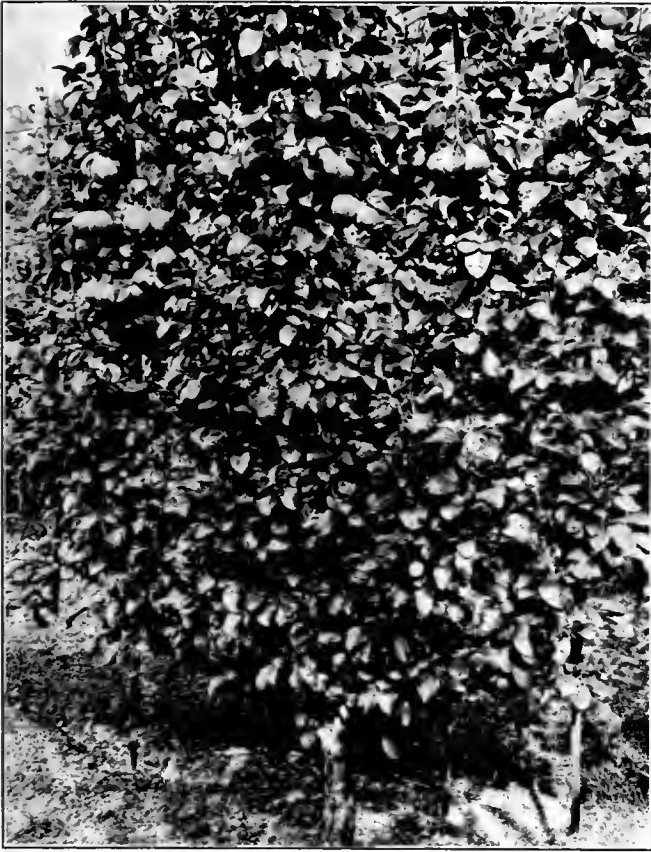
pose as any fruit. Spaced at intervals of three feet, the little trees will grow into a compact hedge that will be beautiful at all seasons. Nothing in nature is lovelier than the creamy white blooms and olive green leaf clusters in early spring. The growing fruit is ever attractive, and the mature fruit is a joy to see.

Such a hedge can well contain pears of different varieties, that will mature at different times. The Clapp's Favorite and the Bartlett, that mature early, are of highest quality. The Sheldon pear is wonderfully attractive and also of fine flavor. The Keiffer should surely be represented, both because its fruit keeps until well into



SHOWING THE ADAPTABILITY OF THE PEAR TO HEDGE USE

This is an excellent illustration of the way fruit trees may be trained to grow in a vertical plane—a dwarf pear trained up on an espalier wall.



THE FRUIT OF THE EFFORT

This is a section of a pear hedge which proves the wisdom of training fruit trees to such use. It is at once beautiful and profitable—and the luscious fruit speaks for itself.

the winter and for the exquisite beauty of its fall foliage. By judicious pruning and training, such a hedge can be made to grow mainly in a given plane, like a tree that is grown with its limbs flat against a building. Thus such a hedge need not necessarily occupy nearly as much space as one would expect it to occupy.

Few people, probably, would care for so many quinces as even a little hedge would yield. Such persons might prefer a hedge of mixed dwarf fruit trees. But there are certain difficulties in making such a mixed planting wholly successful. Unless the various plants grow to about equal size, the hedge will have a ragged, uneven appearance that may be displeasing. Again, the plants in such a hedge should be such as require similar culture. Undoubtedly it would ordinarily be advisable to make such a hedge of one species.

Where space is not at a premium and productiveness is no inducement, there are unusual kinds of ornamental hedges that one can plant. We ourselves have just completed the planting of such a hedge along one of our fields that borders the public highway. This hedge is made wholly of spireas, with ninebarks and hardhacks set alternately. One blooms early, the other late. One makes a rounded, graceful mass of green, with drooping sprays of white flowers. The other is a rather stiff, up-standing plant, with spikes of pinkish blooms.

A floral hedge with an even greater variety of plants would be desirable. By planting bushes that bloom in

succession, one could fashion a hedge that would be in blossom for weeks. *Forsythia suspensa*, the corchorus, the lilaes, the spireas, the Deutzias, and similar bushes lend themselves well to this sort of planting. If one prefers, a hedge can be made of a single variety. Probably it would be difficult to find anything lovelier than a hedge of *forsythia suspensa* would be, with its pendant branches laden with golden flowers.

The fact is that almost any hardy plant of appropriate size can be used for hedge making. In planting, as in other lines of activity, we Americans have gotten into more or less of a rut. We plant privet hedges because our neighbors do. It seems the accepted thing. But when we unexpectedly run into something original, that is as beautiful as it is unusual, we are almost shocked to find that the thing can be so lovely. The gardening of the future will more and more tend to free us from the shackles of convention. And we shall get more satisfaction from our plantings, whether they be of flowers or hedges, when we plant to express our own natures, than we get when we merely follow the beaten track. Some of us may prefer the privet to all other plants. For such a person the privet is the thing above all else. But some of us may really prefer other plants and yet not have considered the possibility of using them in such an uncommon way. And probably few of us have ever really regarded the hedge from the view-point of thrift. It is worth considering.



WHAT COULD BE MORE BEAUTIFUL THAN THIS BLACKBERRY HEDGE?

Its many spring blooms will be succeeded in summer by shining black berries, while the bronze red autumn foliage is one of the most artistic of all fall leaf displays.

AMERICAN FORESTRY GUIDES DEPARTMENT

SOLAN L. PARKES, EDITOR

THIS DEPARTMENT IS CONDUCTED ESPECIALLY TO INSTRUCT THE YOUTH OF AMERICA TO AID IN CONSERVING AND PRESERVING THE FORESTS, TREE, PLANT, BIRD AND HARMLESS ANIMAL LIFE.

THE American Forestry Guides is now an organization all ready, to organize councils and posts as well as to enroll individual members. This organization was created at the request of the many readers of the Forestry Guide department in the American Forestry Magazine. Great pains have been taken in the preparation of a program that would be attractive, instructive and helpful to lovers of the outdoor life. Immediately after the Forestry Guides department was established in the American Forestry Magazine it became evident from letters received from all parts of the country from the friends of forestry that an organization should be formed with its purposes based on the declaration of principles, as appears elsewhere in this department. Prominent educators, laymen, boys, girls, young men and young women in many parts of the United States were communicated with and responding, urged that an organization be created. Guiding ourselves by the suggestions offered, a group has for months been working in the preparation of a program that will promote health and progress and create sentiment for the conservation and preservation of our forests, and the life therein as well as the life



Charles A. Snyder, President American Forestry Guides

in field and stream. It will also encourage clean sport, hiking and camping, will teach to do by doing, have as its motto "Service to God, to Country, to Fellowman."

As stated, we are ready—and will now say, quoting Postmaster General Hays in his recent message, "Let's go."

Let's go and organize Councils to supervise the Posts in specified territory; organize Posts where no councils exist; enroll individual members where no Posts exist.

All pull together and "Let's go"—save the forests of the Nation as well as our tree, plant, bird and harmless wild life, with the realization that our youth and posterity will enjoy and be benefited.

Council organizations are composed of fifty or more persons who organize themselves into a body to have jurisdiction over the Posts in a fixed territory—i. e. city or county boundary line, to be determined, and to provide executive leadership.

Posts consist of groups numbering from ten to forty-eight members under an adult leader with an assistant of not less than 17 years of age for every sixteen members in the post. A full post will have one adult and three assistants.

GREETING FROM CHARLES A. SNYDER

In assuming the position as president of the American Forestry Guides, I wish, first of all, to send greetings to the numerous Guides and those under whose directions they have been carrying on their work with such notable success. The service you are performing is one of true patriotism, and it will be a cause for self-gratification, if I shall be able to assist in advancing the worthy purpose of the organization.

At the same time, I invite the co-operation of each and every fellow-citizen who realizes the importance of reforesting the waste areas of our country and of conserving the few existing forests. President Harding's showing, in his recent proclamation, of the devastation caused by forest fires, should set people to thinking who perhaps never before paid any attention to this matter. And by encouraging and supporting the Forestry Guides, they can be made an efficient national agency for just that purpose.

The movement looking towards enlarging this organization is a constructive, patriotic movement from both an economic and a social point of view. As our population increases, the cities and towns will increase in size and in numbers. If these are surrounded by arid areas, there is little hope for a wholesome national life. I believe in the idea of giving people a sense of the beauty of this world and then making them fit to live in it. This two-fold project will be constantly fostered by the teaching and practice of our Forestry Guides in preserving the Forests of our country and the wild life and flora therein. I know the founders of the organization had a somewhat similar idea in mind when they designed it "to conserve and preserve the forest and the life therein, with the youth of the country, and the youth with the forest."

On behalf of the organization of American Forestry Guides, I invite examination and co-operation by the people of the United States. Its work can be developed along with the public school education, and will give an impetus to that education. Give the youth of the land an interest and part in conserving the forests, that the two may be said to grow up together, and when the youth become the citizens they will appreciate the forests and know how to care for them. I feel proud in having been chosen as your leader. Let us make our country the best country, our people the best people. Let us learn to do by doing and ever remember that we owe service to God, to country, to fellowman.—CHARLES A. SNYDER.

Posts are subdivided into details of eight, making six details to a post.

Posts are to be named in honor of some great American citizen (Roosevelt, Franklin, etc.) The details are to be known by number; (Detail No. 1, 2, 3, etc.)

In working out the organization plans we have not lost sight of the youth in the rural districts. We are more than anxious that the young people of the United States be enrolled and become one of our family of Forestry Guides. Write us. Your country needs you in this conservation work. We know you want to help.

We ask the Outdoor Organizations of the country to help make our program available to the youth of the Nation.

Conservationists and Foresters; will you wake up? will you join us? The youth of America is more than anxious to help. All that is needed is guidance and leadership.

"LET'S GO"

We have searched far and wide for an aggressive, fearless, man for president; one who places cause before self, and appreciates the fact that our greatest asset is our

or young girls can organize posts under the leadership of their sex.

For full particulars write to American Forestry Guides, General office, Reading, Pennsylvania.

In presenting to the Forestry Guides a picture of their new president, the Honorable Charles A. Snyder, we assure them that his personality is just as pleasing as his picture shows. He is aggressive in whatever he undertakes, shows good judgment, and has a ready wit; in fact, he possesses just the qualities of a good leader, as his success in public life proves.

Mr. Snyder is at present State Treasurer of Pennsylvania. He had been Auditor General of the State, and made such a remarkable record in that position that he received the nomination for State Treasurer without opposition. Prior to that, he had served three terms in the Assembly and was serving his third term in the State Senate when he was elected to the higher office. In all these years he was especially popular with the young voters, who supported him without regard to the party to which they belonged.

Mr. Snyder was born at Pillow, Dauphin County,

DECLARATION OF PRINCIPLES OF THE AMERICAN FORESTRY GUIDES

IT IS A VOLUNTARY SERVICE ORGANIZATION for the creation of sentiment among the youth of America to conserve and preserve our forests, tree, plant, bird and harmless wild life thereby conserving the youth with the forests. It aims to help the youth to become self reliant, and develop true citizens and teach to do by doing.

IT IS ABSOLUTELY INDEPENDENT, having no official connection with any federal or state department. It is not controlled by any special interest or agency. It is non-military, non-sectarian, non-political.

It will function as a volunteer service auxiliary with our federal and state departments, promoting causes for our common good and offering full cooperation. It will devote itself to public service and is pledged to abet national, state and community welfare, progress and prosperity.

It has for its major objective conservation of the forests and other natural resources by the youth of America. The youth by making available an educational program whereby the trees can be identified without specialized training in forestry; the birds without becoming an ornithologist; the wild flowers, without detailed knowledge of botany. It promotes health and body building. It recognizes that our country's greatest asset, its youth, must be conserved.

It will know but one flag—The stars and stripes.

It has for its motto "Service to God, to Country, to Fellowman."

youth, our greatest need conservation, that success depends on happiness, that if one would be happy, one must be active.

We found the man. We can trust his leadership. Read what he has to say.

"Let's go" while the legislative bodies are legislating. "Let's go" plant trees, stop forest fires, conserve bird and harmless wild life and the youth by bringing them close to nature and nature's God.

Slogan "America First."

We were very fortunate in having a wireless communication expert join our Forestry Guide family. He will tell us how to build, operate and care for wireless outfits. His belief is that wireless will become the communication method.

We have many other features in our program that will interest you.

What do you think of Mounted Posts; horsemanship taught by competent leaders?

And best of all we allow you self definition as to age. Boys or girls between the ages of 9 and 14 can organize posts under leadership of their own sex and young men

Pennsylvania. He received his education in the public schools and at the old New Berlin and Berrysburg Academies, and later read and practiced law in Pottsville, where he has since resided. Here he has a beautiful home and home-life with his wife, a daughter and a son, the latter being at present a senior in Pennsylvania State College.

During the years that Mr. Snyder was in the State Legislature, he supported every measure proposed that aimed at conserving the natural resources, assisting the industries or improving the roads and institutions of the State. To him is conceded the credit of putting new life into the public schools of the State by introducing the first bill to increase the salaries of teachers.

It is quite fitting that a resident of the state which received its name from the magnificent forests that covered its entire area at the time of its settlement, and which suffered more than any other state by reason of reckless destruction of those forests, should now be the first leader in a nation-wide movement to restore the forests of the entire country to something of their former usefulness and beauty.

EDITORIAL

MINIMUM REQUIREMENTS

A NEW phrase has recently come into forestry language. As covered by the two words "minimum requirements," it commonly refers to the minimum of protection and silvicultural practice which will assure natural regeneration or perpetuation of forest growth.

It means much because in the present status of forest legislation and management in America, the attainment of the minimum is yet the first step. In anticipation of the formulating of a national forest policy sufficiently satisfactory to be adopted and applied, a very wise preliminary step is being taken by the Chief Forester in ascertaining the minimum requirements of representative forest regions. By such studies and through the discussions which naturally follow, the problem is made more concrete thus giving promise that the essentials which have long been obscured, with perhaps some new recommendations, will become generally recognized and actually applied in the woods.

As has been frequently pointed out by American Forestry and by all who have any knowledge or interest in the forests, fire protection is the absolute minimum under any plan or policy, since without it there can be no new forests, and the old ones will always be jeopardized. All other requirements are secondary, and there is a growing conviction that if systematic fire protection is attained through federal and state agencies in cooperation with private owners, backed by an enlightened, aggressive public opinion, which will curb the danger from careless or malicious individuals, at least a good start will have been made towards a new forest growth on cut-over lands.

The several things which represent the minimum silvicultural requirements vary widely in different regions and with the character of ownership. Whether we have a diameter limit of six or twelve inches, or none, or require top lopping or brush disposal of softwoods and not of hardwoods, or neither or both, is a local problem

to be worked out and applied as such. Foresters can do much to assist nature, the application of their profession ranging from the reforestation of absolutely denuded areas to the regulation of cutting and systematic plans of management which increase both the volume of wood production and its quality. The things which they could do, however, cannot always be done, because of economic limitations, hence the importance of local studies which give a basis for specific action rather than generalization and no action. In the meantime, natural reconstructive agencies are on duty every minute.

The minimum requirements in any region must be known and applied before the maximum measures may be taken. Forestry, like every other great development is an evolution, and while America can draw on the technical knowledge and experience of Europe, the growth of public sentiment and the changes in the economic influences are almost as slow as though there was no European background of knowledge and experience.

Forestry progress in the United States during the past twenty years is represented largely by fire protection and education, and in these notable progress has been made. On the national forests and to a much less extent on state lands, there has been a beginning in actual forest management, but elsewhere the movement has been largely conversation. The great saving factor is that the forests have regenerated themselves over enormous areas of cut-over land, and while this has been restricted and damaged by fire, these new forests have a greater extent and value than is generally recognized. We continue to forget that new forests cannot be grown in a day nor by talking about it, and in making plans and policies, it is becoming continually more apparent that if reasonable minimum requirements in keeping with regional conditions are applied, a foundation will be established on which to build and expand to meet the wood requirements of posterity.

PROFIT IN FOREST RECREATION

NO small amount of space in these columns has been devoted to telling of the recreation to be found on Forest lands. The majority of the articles have dealt with some problem of use rather than production. Now with Congress soon to consider the budget for the coming year it may be only good business to spend some time and thought in summing up the amount of money we have invested in recreational development in our forests, what it is producing on that investment and what is needed to place in our Forests at least the more urgently needed recreational developments so they may more efficiently produce recreation.

It may be a new thought to consider the Forests a place comparable to a plant manufacturing recreational products. Maybe recreation should not be viewed as a commodity. And yet it is sold in the amusement market

every day in the year. There is a regular basic price per hour that will provide one with decent recreation. And those places which offer this product on the market are nothing more than recreation manufacturing concerns. Therefore if the Forests produce recreation comparable to that found in the city markets it is logical to think of the entire system of Forests as potential recreation manufacturing plants.

What are the products in Forest Recreation? They are many and cannot be rightfully nor fully computed on the market price basis. Yet it will be worth while to compare them in a general way with the cost of what is sold in marts of amusement.

It is estimated by actual count that in 1920 more than four million people visited the National Forests of our country each staying approximately two and a half days.

In this way more than ten million recreation-days were secured which were in every case at least ten hours long. If this is computed on the lowest possible cost of recreation in the market or ten cents an hour it would mean each day was worth not less than a dollar to each person securing it, or for the entire Forest system there were "marketed" ten million dollars worth of recreation units. Even on this basis which is wholly inadequate the recreation commodity in the Forests topped all other receipts from other sources in forest products combined. Only these people were not charged a cent for this use which is theirs by right so this money was not collected. Collection or no collection, the value of recreation is still there.

This is putting recreation in the Forests on the dime and dollar basis. It is the lowest estimate we can make of the use. A dime an hour will never cover the real values nor will a dollar. The real values lie in better health, cleaner minds and bodies, broader vision, greater love of country, increased efficiency, keener knowledge of nature and God and the many other body, soul and mind benefits which come from play in the open.

* * *

Can these be reduced to a market value? Where is there a place that you can buy so many hours of communion with God through Nature? Where can we get a ton or so of patriotism and at what price? Is there a place where they sell good health by the hour and what is the cost? There is no place in the land where such values can be produced better than in the National Forests and therefore our manufacturing plant for recreation found there is one of the most important factors in the future of the land producing and delivering directly to the populace as it does, these values which cannot be measured in money.

It is perfectly conceivable that through outdoor play this Nation will come to produce a race of men and women of greater thinking powers, more robust bodies and finer souls than the world has ever known. The cities will never do it. The Forests alone will never accomplish it. But a combination of city in which to apply the lessons learned in the Forest and the Forest in which to turn for strength and inspiration when the city palls may do it. If it is to be accomplished we must come to recognize and never lose sight of the fact that if we are to produce the recreation to do this we must organize it and develop it so it may be of service just as surely as we have developed our other great producing plants of the country.

These are the products from our plant for human service in the Forest. Ten million days of play of unbeatable quality were produced through the human use of Forest lands in the one year. With this mammoth annual production it is reasonable to suppose that some substantial sums have been put into improvements which make this use possible but—

Congress has never appropriated one cent for recreational improvements in the National Forests!

It is a fact that a ten million dollar value on the market price basis is produced in the human use of our

National Forests each year without there having been one dollar officially spent by the Nation to produce it. In a few places local people have spent a few thousand dollars to provide necessary improvements to make the use of the Forests *safer*. But the use is National in scope and the local people should not have to develop that which will be of benefit to the entire Nation.

At first glance it may seem that local inhabitants will make the greatest use of these developments. That is true. But do not local inhabitants reap the benefit from improved highway development? Immense National funds go into this activity each year and while the people in distant states may have some benefit from a direct use of the road it more generally is used in local traffic.

Then is it not true also that if the health of a city near a National Forest is made better by the use of the playgrounds there that it raises the health, spirit and productiveness of the entire country just that much? It is small that is true but is it not the same sort of a situation as the highway example? The Nation benefits through the individual and this is true in Forest Recreation.

* * *

But the application and comparison does not cover the entire situation. The use of the National Forests for play is truly National. In the first place they are located East, West, North and South. They can be easily reached from population centers. And in the second place the Forests of the West have each year thousands of visitors from every state in the Union. Every one seeking the mountain lands of the West uses the National Forests for some sort of recreation and through these individuals from the many states the city, county, and state of which they are citizens benefit from forest play.

Last year Forester Greeley asked Congress for the small sum of \$50,000 to be placed in recreational improvements in the Forests. Such an amount would not begin to even take care of the sanitary features. This small asking must have been wholly based on the need for economy rather than on what should be done. In spite of the fact that this would and should meet only the most imperative needs this item was stricken out of the bill in the sub-committee.

This eliminated the possibility of securing National funds for developing the producing and protection features of Forest Recreation last season. If it were fully realized that such a fund would have produced a million dollars more worth of recreation it probably would have been demanded by the public in general and have been endorsed by this sub-committee. And if it were generally realized that such an expenditure is necessary to protect human life in the Forests it would unquestionably have received more consideration than it did. These two conditions are true.

This fall Col. Greeley is asking for the extremely modest sum of \$10,000—to take care of the protective situation in camp areas on 152 National Forests totaling 156,000,000 acres! It will not begin to do this, of course, but it will eliminate a few of the most dangerous places.

The success of this item depends upon the realization of the people that it is the beginning in the securing of the funds which are necessary just to make fit for use those places now visited by millions who come to the Forests for play and rejuvenation and upon their power to impress Congress with the necessity for making this start.

It is imperative that this and more money be appropriated as quickly as possible to prevent the loss of human life. The figures of the Board of Health of Colorado show that in the last three years from 1918 to 1920 inclusive, 311 people died of typhoid fever. Nearly every case can be traced directly to infection contracted while the person was on a camping trip in the hills. And this means for the most part National Forests. If one hundred people per year are killed in this state through the lack of proper sanitation it is probably true that ten times that number are similarly stricken in the remainder of the twenty odd states where are National Forests. If this little appropriation will prevent the death of one half this number it will mean that only \$20 per life has been spent to save it. Is not a human life worth at least \$20?

This little item of \$10,000 will not take care of the urgent needs for sanitation in the National Forests. It will not touch the field of real development to produce recreation as a regular organized forest product—a thing which good business efficiency demands. Several hundreds of thousands of dollars are needed at once to even make the present areas used in the Forest efficiently producing recreation machines. But this little drop in the bucket of what should be done will without doubt mean better sanitation in some camping places where conditions are dangerous to human life. This is sufficient reason for this to have every support, every consideration possible from Congressmen and people at large.

* * *

We are reaping an annual profit of ten million dollars worth of recreation from the National Forests without a cent of investment in producing machinery designed for this use. But beyond this we are producing values in inspiration, health and greater efficiency within the

Nation which are beyond any dollar scale measurements.

But there is a waste—a loss. One hundred human lives per annum in one state are snuffed out through typhoid contracted on camping trips. Proper sanitation means no typhoid. But funds must be secured to introduce proper sanitary developments. That is what this little appropriation of \$10,000 if passed, will start out to do. No more urgent need exists in the Nation today than that of proper sanitation in these play areas.

It has been stated in the press that 75 bodies have been recovered from the Pueblo flood. Hundreds of thousands of dollars flowed into the stricken city for relief. The entire Nation responded individually and officially. And yet in the same state the lack of proper sanitation in the mountains yearly takes thirty three per cent greater number of lives than this figure. And not a cent has been forthcoming to relieve this far worse known annual death list.

Forest Recreation must be safe and efficient. Sanitation is the first consideration. Any advancement which will make it both, efficient and safe, should have sober consideration. First, life must be protected by sanitariums, clean water and garbage pits. Then attention must be turned to real organized production of the recreation commodity. This pitiful little \$10,000 will do the first only in a few localities but it may mean the saving of scores of lives. It does mean a recognition of this activity within the National Forests and makes a start towards the greater field of development which will equip the Forests to properly serve the millions who now come to them for recreation.

So let us get our profit without loss. It can be done. And let us be good business people and invest as much as ten per cent of our annual profit in producing machinery.

Profit—and Loss! The increase of the former comes with the elimination of the latter especially in Forest Recreation. Human kindness and good business both demand a congressional appropriation for Forest Recreation.

ANCIENT "MULLAN TREE" TO BE PRESERVED

THE Mullan Tree, landmark of the old Mullan Trail, the first highway connecting Montana and Idaho with the coast, will be preserved to posterity through the creation of a national monument area by the President.

On July 4, 1861, Captain John Mullan, leader of the party having in charge the survey and construction of the Mullan Trail from Walla Walla, Washington, to Fort Benton, Montana, closed his work at the connecting point of the roads from the east and west, at the head of the Fourth of July canyon, between Wallace, Idaho, and Coeur d'Alene, Idaho. There he marked appropriately a huge white pine tree, which since that time has been known as the Mullan Tree.

HUGE LONE SYCAMORE DISCOVERED

A GIANT sycamore is monarch of the Wabash River bottoms in Gibson County. Eleven feet in diameter, thirty-three feet in circumference and 150 feet high, the lone sycamore stands in the middle of a small field overlooking the Wabash River at a point two miles south of East Mt. Carmel, Indiana. There is no such other tree in Gibson County and nothing like it in this part of the state, so far as is known.

Measurements and photographs of the tree have been taken recently by Vivian W. Agniel, assistant engineer for the Patoka-Wabash levee, and have been sent by him to the American Forestry Association for historic record.

THE AMERICAN WALNUTS

BY JOSEPH S. ILLICK

THERE are fifteen different kinds of Walnut trees in the world. Four of them are native to the United States. The Black Walnut and the Butternut are found in the eastern United States. The scientific name of the Black Walnut is *Juglans nigra*, and that of the Butternut is *Juglans cinerea*. A third species, known as California Walnut, occurs in California and the Southwestern Walnut is found in Texas, New Mexico and Arizona.

The nearest relatives of the Walnuts are the Hickories. These two important groups of timber-producing trees

most of its associates in that it has only a few common names. Throughout its entire range of 650,000 square miles, it is called Walnut, Black Walnut or Walnut-Tree. Rarely, if ever, is any other common name applied to this tree in its entire range. The adjective black refers to the color of the wood and the bark. This distinctive characteristic enables one to recognize it easily from all other closely-related trees.

The Black Walnut bears little resemblance to any other forest tree native to the eastern United States, except the Butternut. These two trees may be distinguished from all other forest trees by their rough and sculptured nuts covered with an unsplitting husk, and by their chambered or interrupted pith. Only a few other trees native to North America have a chambered pith, and the fact that the Walnuts have a brown and chambered pith is one of the best distinguishing characteristics found in any American forest tree. This helpful distinguishing characteristic may be observed by cutting a twig lengthwise and examining the pith, which is always located at or near the center.

The Butternut, also called White Walnut, may be distinguished from the Black Walnut by the following characteristics:



BARK OF THE BLACK WALNUT

The adjective black refers to the color of the wood and the bark, which ranges from a rich brown to black.

belong to the same tree family, and may be distinguished from each other by the following characteristics:

WALNUTS

- (1) Pith of twigs is chambered.
- (2) Nuts are rough and sculptured.
- (3) Husk of fruit does not split.
- (4) Tassels of pollen-bearing flowers are thick, compact, not stalked, and occur singly.
- (5) Wood is light to dark-brown. Pores are scattered rather evenly throughout the growth ring.

HICKORIES

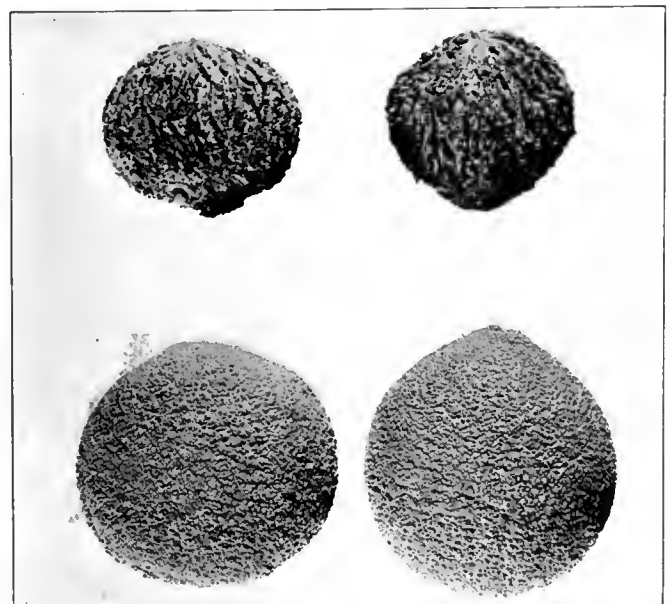
- (1) Pith of twigs is continuous, not chambered.
- (2) Nuts are smooth and usually ridged.
- (3) Husk of fruit usually splits into 4 valves.
- (4) Tassels of pollen-bearing flowers are slender, flexible, stalked and occur in three's.
- (5) Wood is white to reddish-brown. Pores range from large to small; large pores occur in concentric rings in spring wood, while small ones are distributed irregularly in the summer wood.

BLACK WALNUT

- (1) 13 to 23 leaflets to each leaf.
- (2) Bark is dark brown to black.
- (3) Pith is light brown.
- (4) Nut is round.
- (5) Husk of fruit is smooth.
- (6) Terminal bud is as broad as long.
- (7) No hairy fringe occurs above leaf-scars.

BUTTERNUT

- (1) 11 to 17 leaflets to each leaf.
- (2) Bark is gray.
- (3) Pith is dark brown.
- (4) Nut is elongated.
- (5) Husk of fruit is hairy and sticky.
- (6) Terminal bud is longer than broad.
- (7) Hairy fringe present above leaf-scars.



BLACK WALNUTS, WITH AND WITHOUT THE HULL

The Black Walnut is unquestionably the best-known member of the Walnut family. It is more fortunate than

The black walnut, a favorite because of its sweet, rich fruit, is readily identified in either one dress or the other.

Of all the forest trees found in the original forests of America, the Black Walnut probably suffered most at the hands of the early settlers. This was due to the well-known fact that it stood upon the best land in the fertile valleys and bordering foothills. These areas were selected by the pioneer farmers for their clearings and farms. A large number of the choicest Black Walnut trees were felled and burned simply to get rid of them. Many more were split into fence rails and other similar ordinary uses before the real merits of the wood became known.

Now the wood of Black Walnut brings a high price. It is no longer destroyed and wasted, but every available piece is collected and manufactured into some useful article. It is not used any more for rough lumber as it was in the early days, but all of it goes to factories, where it is converted into finished articles.

The wood of Black Walnut is used for so many different purposes that an attempt to list all of them would become monotonous. Some of its principal uses, however, are furniture, sewing machines, musical instruments and coffins. Lare quantities are also consumed at home and abroad in the manufacture of gun stocks. It was in great demand for gun stocks during the Civil War and fabulous prices were offered for almost any grade during the recent World War. Special scouting expeditions were organized in every part of the country



BARK OF THE BUTTERNUT

This tree is often called the White Walnut because of the light grayish color of the bark on the main trunk and larger branches.

where the Black Walnut grows in order to locate all available supplies, but in spite of this thorough scouting a large number of trees still remain standing. The tree, however, is no longer abundant in any locality, and the total supply of Black Walnut wood in the country is waning rapidly.

The Butternut is one of the best-known nut-bearing trees native to the eastern part of the United States. It occurs along the coast from New Brunswick to Delaware, and extends southward along the mountains to Georgia and Alabama. It reaches westward to the Dakotas, Nebraska and Missouri, and is also found in Arkansas. The Butternut bears a general resemblance to the Black Walnut, but can readily be distinguished from it by the characteristics given in the table that appears in the fore part of this article.

The Butternut is also known as the White Walnut because of the light grayish color of the bark on the main trunk and larger branches. The bark on old trunks is often light brown and that on the smaller branches grayish green. Probably one of the best distinguishing characteristics of the Butternut is its leaflets, which usually number 11 to 17 to each leaf, and are quite sticky and hairy. This sticky and hairy feature is not only characteristic of the leaves but also is found on the fruit. The



HULLED AND UNHULLED BUTTERNUTS

Nuts readily recognized by their rough and sculptured shells or their familiar husks.



THE ROCK-SPLITTING BUTTERNUT

This famous and widely-known old tree is at Devil's Den on the Gettysburg Battlefield.

elongated nuts are also distinctive. The kernel is sweet and has a pleasant flavor, but like that of the Black Walnut, soon becomes rancid. It is more oily than that of the Black Walnut, and because of this distinctive feature the Butternut is often called Oil Nut.

The wood of the Butternut is also a positive means of identification. It is paler than that of the Black Walnut, but it is in no way inferior to it as an ornamental wood. The tree branches freely, often forming many crooks and crotches from which is obtained the highly figured wood prized so highly in the furniture industry. In house furnishing and finishing, Butternut wood is particularly beautiful. The natural finish brings out the quiet tones and the soft luster of the grain in such a way as to give satisfaction to everyone who looks at it.

The Butternut is a rather rapid growing tree, but it is not long-lived. It begins to deteriorate when it reaches medium size, and the trunks of older specimens are usually hollow. Numerous kinds of fungi attack its heartwood, which accounts for many hollow-butted trees that occur along fences and in woodlots. While the Butternut is fairly attractive and thrives well in the forest, and along fences, streams and roads, it cannot be depended upon for ornamental planting.

The two Walnuts which are native to the western part of the United States are the California Walnut and the Southwestern Walnut. The scientific name of the former is *Juglans Californica*, and that of the latter is *Juglans rupestris*.

The California Walnut is a small tree. It occasionally reaches a height of 50 feet, and is limited in its distribution to the coast of California, where it occurs from almost sea level to an altitude up to 3,000 feet. Its trunk is usually short, and gives off big branches which curve upward and form a handsome dome-like crown. The bark on large stems is rather rough and blackish but on young trunks and large branches it is smooth and ashy white.

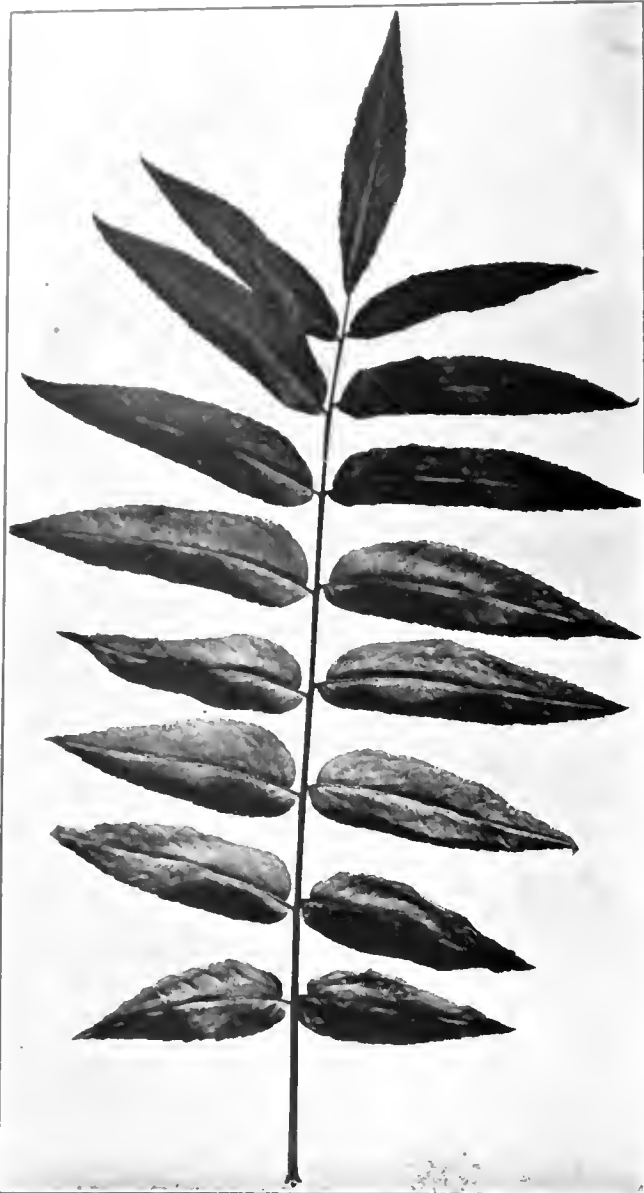
The California Walnut resembles the eastern Black Walnut sufficiently to suggest to anyone that it is a Walnut. Its leaves are compound, with from 9 to 17 leaflets to each leaf. They are light yellowish green in color, and smooth on both the upper and lower surface when fully grown. The fruit is spherical in outline and contains a small thinly covered nut with a sweet kernel. The husk is thinner than that of most other species of Walnut native to North America. If the husk is removed from the hard-shelled nut the two ends appear to be compressed, which gives the nut an irregular and flattened appearance at the ends.

The wood is rather heavy and dark brown, but somewhat lighter in color than that of the eastern Walnuts. It is moderately coarse grained and has some commercial value. The tree, however, rarely grows large enough to produce lumber in sufficient quantities to be of much commercial value. The wood is used chiefly for cabinet purposes, on account of



CALIFORNIA WALNUT SEEDLINGS

This fine young crop is in a Pennsylvania forest tree nursery, and consists of seedlings only one year old which range from 6 to 30 inches in height.



A LEAF OF THE CALIFORNIA WALNUT

The leaves of this species are compound, with from 9 to 17 leaflets to each leaf. They are light yellowish green in color and smooth on both the upper and lower surfaces when fully grown.

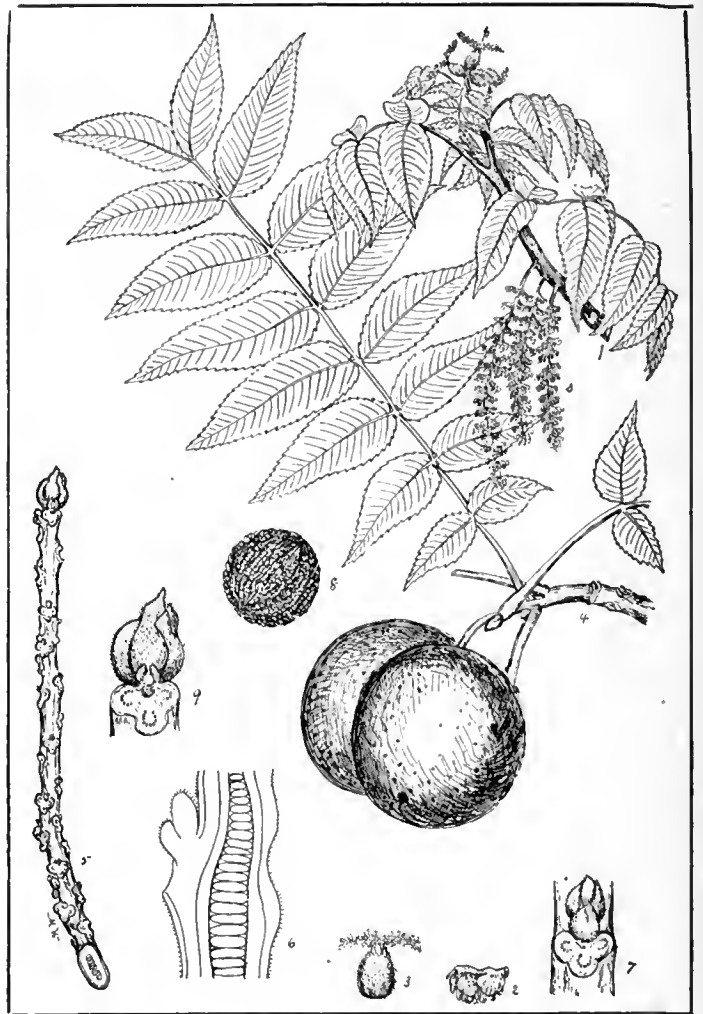
its handsome color and good working qualities.

It is a very rapid growing tree in youth, but rarely, if ever, exceeds 150 years in age. Trees from 12 to 15 inches in diameter may be only 10 or 20 years old, while one tree 15 inches in diameter showed an age of only 15 years. Probably one of the most valuable uses of the California Walnut is as a grafting stock for the English or Persian Walnut, which is now being planted on an extensive scale along the Pacific Coast, in the Mississippi Valley and throughout the milder part of the eastern United States.

The Walnut of the Southwest is also a small tree, rarely exceeding 50 feet in height. It develops a trunk which sometimes attains a diameter of 5 feet, but usually ranges from 2 to 2½ feet in diameter. This tree grows on the limestone banks of streams of central and western Texas, where it is rarely more than 30 feet in

height. It is commoner and attains a larger size in the canyons of the mountains of New Mexico and Arizona south of the Colorado Plateau. It is also found locally in northern Mexico.

The leaves of this Walnut are from 7 to 15 inches long, and are made up of from 9 to 23 leaflets. The fruit is round, usually from ½ of an inch to 1½ inches in diameter, and covered with a thin husk, which is usually smooth, but is occasionally covered with fine hairs. The nuts have no ridges and are often compressed at the ends, and sometimes flattened somewhat laterally. They are dark reddish brown to blackish in color, usually 4-celled at the base and 2-celled at the apex. The kernel is rather small but sweet, and retains its flavor for a long time. This Walnut of the Southwest is occasionally culti-



BLACK WALNUT

1. Branch with developing leaves and (s) three solitary catkins of staminate flowers and (p) a spike with three pistillate flowers.
2. A staminate flower, slightly enlarged.
3. A pistillate flower, slightly enlarged.
4. A branch with mature leaf and fruit.
5. A winter twig.
6. Longitudinal section of twig showing chambered pith, enlarged.
7. Section of twig showing superposed and gaping buds, and leaf-scars with three clusters of huddle-scars and notched upper surface, slightly enlarged.
8. A nut with husk removed.
9. Terminal section of winter twig showing leaf-scar and terminal bud with bud-scales, slightly enlarged.

vated in the eastern United States, and is hardy as far north as Massachusetts. It is also cultivated to a limited extent in Europe, but no extensive introductions have yet been made either in Europe or the eastern United States.

The two western species of Walnut may be distinguished by the following distinguishing characteristics:

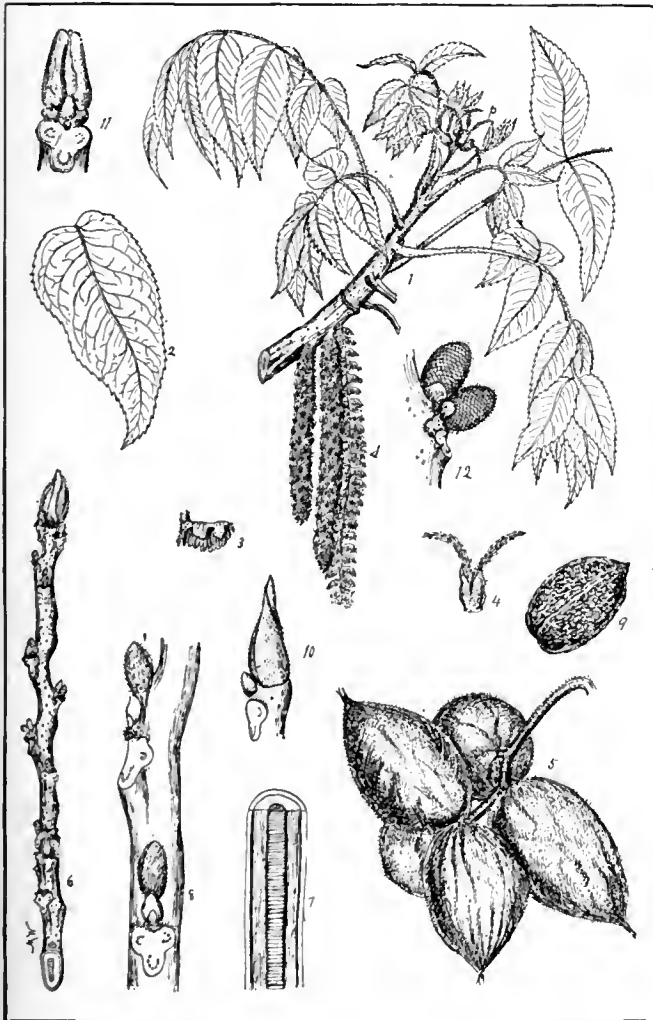
- | CALIFORNIA WALNUT | SOUTHWESTERN WALNUT |
|---|---|
| (1) Leaves with 11 to 17 leaflets. | (1) Leaves with 9 to 23 leaflets. |
| (2) Leaflets 1½ to 3 inches long, and ¼ to ¾ of an inch wide. | (2) Leaflets 2½ to 5 inches long and 1-3 to 1½ inches wide. |
| (3) Nut obscurely grooved. | (3) Nut deeply grooved. |
| (4) Nuts with rather thin shells. | (4) Nuts with rather thick shells. |
| (5) Native to California. | (5) Native to Southwest. |

In addition to the native Walnuts, a few foreign species have been introduced. The English or Persian Wal-



LEAF OF THE ENGLISH WALNUT

The English or Persian Walnut is a valuable economic tree as its fruit is about the most widely used of the walnuts and its wood is the highly valued Circassian Walnut of commerce. The foliage is very beautiful.



THE BUTTERNUT

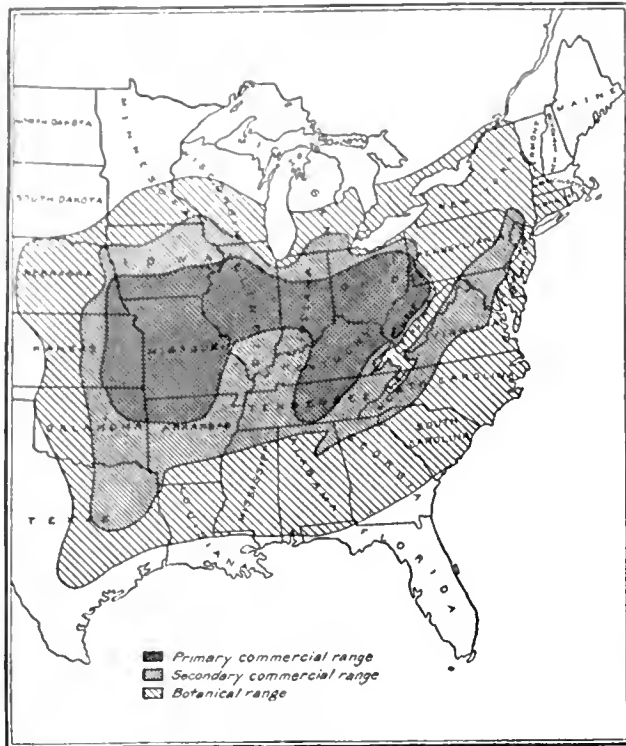
1. Branch with one-half developed leaves, (s) 3 unbranched catkins of staminate flowers, and (p) a cluster of pistillate flowers, x ½.
2. A mature leaflet, x ½.
3. A staminate flower, slightly enlarged.
4. A pistillate flower, slightly enlarged.
5. A cluster of mature fruit, x ½.
6. A winter twig showing buds, lenticels, leaf scars, and pith, x ½.
7. Longitudinal section of twig showing chambered pith, slightly enlarged.
8. Section of winter branch showing leaf-scars, hairy fringe above leaf-scars and superposed buds, slightly enlarged.
9. A nut with husk removed, x ½.
10. A terminal bud, natural size.
11. A terminal bud (broad-side view), natural size.
12. Section of a branch showing superposed lateral flower buds, enlarged.

nut is more widely distributed than any other foreign Walnut. It is now propagated profitably in southern California and a considerable degree of success has been had with its cultivation in the Mississippi Valley and the milder parts of the eastern United States. It is a rather



A TWO-YEAR OLD SEEDLING

This is a fine young black walnut growing on a plantation in northern Pennsylvania.



(Courtesy U. S. Dept. of Agriculture.)

THE RANGE OF BLACK WALNUT

That there is a considerable quantity of walnut still left in the country is due to the immense area on which the species grows and not to the presence of large supplies in any one region.

tender tree and will not endure the cold of our northern winters. Even if its fruit was less valuable it might still be planted for its wood, which supplies the famous Circassian Walnut lumber so widely known and so highly prized in the furniture business throughout Europe and America. In addition to these economic values, this tree also has merits from an ornamental point of view, since it has an attractive bark and beautiful foliage.

Another Walnut which is occasionally introduced into the United States is the Japanese Walnut. It is a small tree of the Butternut type, and promises to become quite profitable in the regions where the English Walnut is not hardy. It is a prolific bearer and its fruit is said to be superior to that of our native Walnuts.

The Walnuts as a group tend to vary and inter-cross, and consequently many natural hybrids have been produced. New and better kinds of Walnuts will undoubtedly be propagated by



A LARGE NURSERY BED

Pennsylvania is doing her part in bringing back the walnut, for there are 22,000 one-year old black walnut seedlings at this Mont Alto nursery.

horticulturists from time to time but it behooves us all to keep on planting the old kind, especially in the regions where they are native. We may thus atone for some of the sins of our forefathers, who stripped the land of the first and most valuable Walnut crop, and unfortunately were not able or willing to provide for another crop.

Walnuts are not hard to grow. It is recommendable, however, to plant the nuts rather than seedlings, for during the first year walnut seedlings develop a long tap-

root, and in transplanting the little trees the tap-root is very apt to be injured, and sometimes the effect of such injury may continue to interfere with the tree's growth for many years. Considerable work has already been done in the establishment of walnut plantations in the United States. Many fine groves can now be seen throughout the country.

Boy Scouts have been doing good work along this line, and many of the forest organizations throughout the country have also taken up the work. In 1919 more than 150 bushels of Black Walnuts were planted in a single nursery in southern Pennsylvania, and in 1920 more than 200 bushels of Black Walnuts were planted in the nurseries operated by the Pennsylvania Department of Forestry.




THE WALNUTS HAVE A CHAMBERED PITH

An almost infallible distinguishing characteristic of the black walnut is its chambered pith, readily discovered by splitting a twig lengthwise or cutting into it, as illustrated.

Tree Stories For Children

Apollo's Laurel

By Mary Isabel Curtis



It was because of Apollo that Daphne was unhappy. Daphne was a wild, young thing. She loved the beasts and birds and flowers better than she did human companionship, and she wished for nothing better than to play among the forest trees the rest of her life. But the River-god, her father, had told her that he wished her to marry Apollo, the golden-haired young sun-god. Apollo was as clever as he was fine looking, for he could play on any kind of musical instrument you might choose to give him, and speak in poetry as easily as he could in prose. But Daphne did not wish to marry anybody.

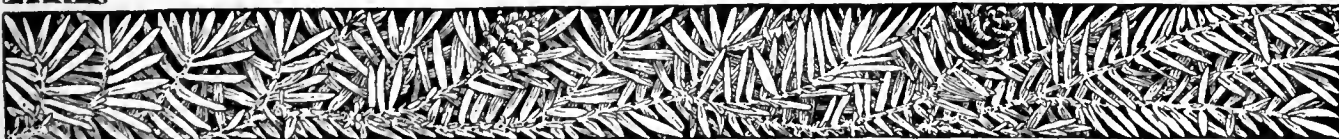

"Let me be free," she said, "to live among the trees and flowers as I have always done, for in no other way can I be happy."

But her father would not listen. So Daphne was sitting in the forest thinking of what he had said and feeling very much depressed. Suddenly she looked around and saw Apollo coming toward her. She jumped up from the ground to run away. Then Apollo saw that she was frightened and called to her:

"Daphne, dear, don't run away, I want to talk to you. Don't be afraid of me."

But the sound of his voice lent wings to Daphne's feet. She ran as fast as she could go, and Apollo, not liking to be left behind, ran after her. Now, although Daphne could run like a deer, Apollo could run faster still, and she soon saw that he was going to catch her. At that, she called to Mother Earth to save her from being taken. Immediately a change came over Daphne. Her feet took root in the ground, her arms and fingers turned to branches and twigs, her dress became rough bark and her lovely curling hair was changed to countless rustling leaves. When Apollo caught up to her she had become a beautiful laurel tree.

"You have escaped me," he said, and laid his hand upon the tree. "But since you cannot be my wife you shall be my tree and I will wear you for my crown. You shall never know decay, but shall be always green, and wherever it is seen, the laurel wreath shall be the sign of victory." As he spoke, Apollo felt a little tremor shake the tree and he knew that Daphne had been pleased with what he said. And this is why the laurel wreath has always been considered as the highest prize that anyone can win.



THE GLACIER HIGHWAY IN ALASKA

BY JOHN D. GUTHRIE, U. S. FOREST SERVICE

FEW people know that it is possible now to visit an Alaskan glacier by automobile—and yet one can hire a car in Juneau at any of the numerous garages, and by a drive of only 11 miles, over a good road, visit Mendenhall Glacier.

This drive is over a part of what is to be known as the Glacier Highway, which when completed will extend from Juneau, the capital of the territory of Alaska, some 60 miles north to Berner's Bay. It will be entirely within the Tongass National Forest except the small portion within the city limits of Juneau.

This highway is being constructed under a co-operative arrangement between the Forest Service, the Bureau of Public Roads, the Alaska Road Commission (composed of United States Army Engineers), and the Territorial Road Commission. The location,

The road starts at Juneau, follows north along Gastineau Channel, past canneries and sawmills, then by farms and dairy ranches, with several silos in sight, for a



ALASKA, THE LAND OF POWER AND BEAUTY THIS SHOWS THE INLET TO AUKE LAKE, VIEWED FROM THE GLACIER HIGHWAY. SUMMER HOMES ARE ALREADY APPEARING ON THE TIMBER COVERED SHORES OF THIS LOVELY BODY OF WATER

distance of some eleven miles, where a branch road turns off to Mendenhall Glacier. Autos may approach

within a few hundred yards of the glacier and visitors, by a short walk past the power plant, may go out on the glacier. There is a camping site nearby which is used by Juneau people who drive out, bringing tents and camping outfits, and spend a night under the shadow of this interesting age-old ice-mass.

On the steep, rock slopes of the surrounding mountains may be seen the



TO VISIT AN ALASKAN GLACIER BY AUTOMOBILE IT IS ONLY NECESSARY TO HIRE A CAR ON ANY FINE SUNDAY AT JUNEAU AND BY

survey and construction work is being done entirely by the Bureau of Public Roads, C. W. Cheathan, Senior Highway Engineer, being directly in charge. The Forest Service, the Alaska Road Commission and the Territorial Road Commission bear the cost.

When completed this highway will be one of the show places of all Alaska.



A DRIVE OF ONLY ELEVEN MILES, OVER A FINE ROAD, ARRIVE AT MENDENHALL GLACIER. WHEN THIS HIGHWAY IS COMPLETED IT WILL BE ONE OF THE SHOW PLACES OF ALASKA

carvings of this slow-moving ice-river as it has relentlessly moved downward for centuries. A roaring stream issues from beneath the mass, tearing at the edges of the immense ridges of rock and gravel ever being shoved ahead by the enormous bulk of ice behind. The forest, through centuries, has been struggling to cover the smooth rock sides of the valley, and has begun to creep up on

posed sixty have been built to date the Bureau of Public Roads is now at work on the construction of the portion along Auke Inlet and will extend the preliminary survey work to Eagle River. In the vicinity of Eagle River there are extensive agricultural lands, some of which are even now being made productive by the eight or ten homesteaders who have settled there. One rancher is said to have cleared \$200 from one-half acre of strawberries in 1919. Fine strawberries and raspberries, and such vegetables as cabbage, cauliflower, rhubarb, potatoes, carrots, turnips and celery, are now grown, as well as a bewildering array of flowers. The extensive meadow lands produce a fine quality of native hay, and here are seen sleek cattle and horses in pasture and chickens around the door yards. The Glacier Highway will open up the markets of Juneau, Treadwell and Thane for the



A VIEW OF THE GLACIER FROM THE HIGHWAY. AUTOMOBILES MAY APPROACH WITHIN A FEW HUNDRED YARDS OF THE GLACIER AND THERE IS A FINE CAMPING SITE NEARBY FOR THE BENEFIT OF THOSE WHO WISH TO SPEND MORE TIME IN THE NEIGHBORHOOD

the terminal moraines, aspen first, flaunting its quivering banners,—now green, now yellow,—with spruces following slowly behind. Here a country in the making can be seen.

Leaving Mendenhall Glacier the highway swings along the west side of Auke Lake where there are fish, boats and bathing. From the highway here magnificent views are to be had on one side, of Mendenhall and Herbert Glaciers, with high above them rugged, snow-capped peaks, and on the other, glimpses of Favorite Channel and Lynn Canal through the heavy stands of spruce timber. Auke Inlet, with points of timber running out almost encircling it, offers charming vistas which will some day delight the tourist. Along the shores of Auke Inlet are a summer home or two, and several canneries, almost hidden from the highway by the fringe of forest between. Although only some fifteen miles of the pro-



DISTINGUISHED VISITORS AT THE MENDENHALL GLACIER. THIS SHOWS CHIEF FORESTER GREELEY AND DISTRICT FORESTER CECIL AT THE GLACIER ON THE TONGASS NATIONAL FOREST

duce of these farming lands. Even now one rancher is planning on buying a Henry, ahead of the completion of the road to his ranch.

The Glacier Highway will be a wonder way for the tourist a few years hence. It will afford alternate views of glaciers, ice-capped peaks, sea meadows, rivers, rugged mountains, forested islands and inlets, farms, and



MENDENHALL GLACIER—A GOOD VIEW OF THE AGE-OLD ICE-MASS WHICH IS DESTINED SOME DAY TO OFFER INTENSELY INTERESTING STUDY TO THE SCIENTIST, WHEN THE HIGHWAY IS COMPLETED AND FACILITIES OFFERED TO ENTICE TOURIST TRAVEL TO THE REGION

canneries, and will be practically at sea level for the 60 miles of its length. Four large and wonderful glaciers, each covering thousands of acres, are visible from it,—Mendenhall, Herbert, Lemon and Eagle,—where these intensely interesting ice-masses may be visited by the tourist and pleasure-seeker or more leisurely studied by the scientist.

When completed undoubtedly the steamship companies will arrange their boat schedules to enable tourists to leave the boats at Juneau, take the trip over the Glacier Highway through this wonderland of the Tongass National Forest to Berner's Bay, and catch the steamer again on its route to Skagway.

A FOREST FIRE ESSAY

BY HOWARD R. FLINT

DOUBTLESS many foresters and friends of the forest have in their boyhood days spent hours in spellbound interest over Robert Louis Stevenson's "Treasure Island," or "Dr. Jekyll and Mr. Hyde," and have in their later years again read these romances of the golden days of adventure with only a little less than their former enthusiasm. Perhaps not so many have spent a pleasant evening over "Travels With a Donkey" or "Essays of Travel," and probably very few recall this talented writer as a contributor to the literature of forest fires in our California forested region.

For the benefit of foresters and others, particularly for the edification of our brothers of the light-burning persuasion, the famous writer's quaint and vivid description of forest fires, together with his amusing experience and rather startling conclusions on technical matters concerning fire, forest, and climate, are quoted here from his chapter entitled "The Old Pacific Capital" in "Across the Plains." True to his intuitive love of Neptune, he opens his discourse with a reference to the sea, calling to the memory of the initiated, thoughts that take them far from the printed pages before them. I quote a potent paragraph:

"The woods and the Pacific rule between them the climate of this seaboard region. On the streets of Monterey, when the air does not smell salt from the one, it will be blowing perfumed from the resinous treetops of the other. For days together a hot, dry air will overhang the town, close as from an oven, yet healthful and aromatic in the nostrils. The cause is not far to seek, for the

woods are afire, and the hot wind is blowing from the hills. These fires are one of the great dangers of California. I have seen from Monterey as many as three at the same time, by day a cloud of smoke, by night a red coal of conflagration in the distance. A little thing will start them, and if the wind be favorable, they gallop over miles of country faster than a horse. The inhabitants must turn out and work like demons, for it is not only the pleasant groves that are destroyed; the climate and the soil are equally at stake, and these fires prevent the rains of the next winter, and dry up perennial fountains. California has been a land of promise in its time, like Palestine; but if the woods continue so swiftly to perish, it may become, like Palestine, a land of desolation."

The fire-fighter who from close contact has filled his lungs and his eyes with the smoke of a real live forest fire may regard as poetic license the reference to a fire atmosphere which is "healthful and aromatic in the nostrils," yet the careful observer recalls a pleasant tang to the smoke of a distant wood fire.

"A little thing will start them, and if the wind be favorable, they gallop over miles of country faster than a horse." This is a word to the wise but careless tourist, and also a timely hint to the ranger or fireman to reduce elapsed time between discovery and control to stop watch units. With this quotation in mind the ranger may also order a few extra men, and strike hard the first day in accordance with good tactics as defined in the foresters' fire manuals.

"The inhabitants must turn out and work like demons," will carry the forester back to interesting and mem-

orable, if not wholly pleasant episodes in his own busy career. If, on the other hand he has fought large fires with crews of the transient "Wobbly" labor of the West, he may be tempted to transpose Stevenson's euphonious phrase and say with some vehemence, "like the devil they will work."

The meteorologist may find theme for a volume in the statement, "not only the pleasant groves are destroyed; the climate and the soil are equally at stake, and these fires prevent the rains of next winter, and dry up perennial fountains." The value of the forest for watershed protection and for its ameliorating effect on climate was noted by this canny and observant Scot at least as long as thirty years since, and a fitting warning sounded. Foresters today, however, are unwilling to take quite so decided a stand on the question of the forest's climatic influence.

"California has been a land of promise in its time, like Palestine; but if the woods continue so swiftly to perish, it may become, like Palestine, a land of desolation." California has been! Consider such a warning! Well, California elected a president in 1916. It may never do so again, and the scene of desolation may well be more definitely forecasted in the arid wording of the Eighteenth Amendment. Who other than California's native sons will gainsay the author's prophetic vision.

To quote further, Stevenson says:

"To visit the woods while they are languidly burning is a strange piece of experience. The fire passes through the underbrush at a run. Every here and there a tree flares up instantaneously from root to summit, scattering tufts of flame, and is quenched, it seems, as quickly. But this last is only in semblance. For after this squib-like conflagration of the dry moss and twigs, there remains behind a deep-rooted and consuming fire in the very entrails of the tree. The resin of the pitch pine is principally condensed at the base of the bole and in the spreading roots. Thus, after the light, showy, skirmishing flames, which are only as the match to the explosion, have already scampered down the wind into the distance, the true harm is but beginning for this giant of the woods. You may approach the tree from one side, and see it, scorched indeed from top to bottom, but apparently survivor of the peril. Make a circuit, and there, on the other side of the column, is a clear mass of living coal, spreading like an ulcer, while underground, to their most extended fibre, the roots are being eaten out by fire, and the smoke is rising through the fissures to the surface. A little while, and without a word of warning, the huge pine tree snaps off short across the ground, and falls prostrate with a crash. Meanwhile, the fire continues its silent business; the roots are reduced to a fine ash; and long afterwards, if you pass by, you will find the earth pierced with radiating galleries, and preserving the design of all these subterranean spurs, as though it were the mould for a new tree instead of the print of an old one."

Accurate and vivid description this, to have been written by one of but scant experience with fire. The

light burning "Piute" forester will do well to note the casual observer's record of "a deep-rooted and consuming fire in the very entrails of the tree." Perhaps this consuming fire gained ingress through the scar of a previous "Piute" fire. Doubtless, too, the tree whose roots "are reduced to a fine ash," are those afflicted with a butt rot or some form of root decay, for it is a rare thing for green sound wood in large trees to burn in the most severe forest fire, or even in the deep-rooted consuming fire that follows a crown or surface blaze.

Stevenson continues with a warning, timely thirty years since, anent the danger that an interesting species confined to a narrow range may become extinct unless protected against the arch enemy of the forest.

"These pitch-pines of Monterey are, with the single exception of the Monterey cypress, the most fantastic of forest trees. No words can give an idea of the contortion of their growth; they might figure without change in a circle of the nether hell as Dante pictured it; and at the rate at which trees grow, and at which forest fires spring up and gallop through the hills of California, we may look forward to a time when there will not be one of them left standing in that land of their nativity. At least they have not so much to fear from the ax, but perish by what may be called a natural although violent death; while it is man in his short-sighted greed that robs the country of the nobler redwood. Yet a little while and perhaps all the hills of seaboard California may be as bald as Tamalpais."

A sober warning this: "Yet a little while and perhaps all the hills of seaboard California may be as bald as Tamalpais." Whoever has seen Tamalpais with its bald dome can appreciate the strength of the simile.

There follows then a lively account of the author's own intimate experience with fire in the forest; an experience so unusual, yet so exactly in accordance with human nature, especially tenderfoot human nature, that it appeals to one at once as being a true account of one of those exasperatingly foolish acts in which every one is from time to time overtaken,—the kind of inspiration which usually ends in humiliation and which occasionally is rewarded by a tragedy.

"I have an interest of my own in these forest fires, for I came so near lynching on one occasion that a braver man might have retained a thrill from the experience. I wished to be certain whether it was moss, that quaint funeral ornament of Californian forests, which blazed up so rapidly when the flame first touched the tree. I suppose I must have been under the influence of Satan, for instead of plucking off a piece for my experiment, what should I do but walk up to a great pine tree in a portion of the wood which had escaped so much as scorching, strike a match, and apply the flame gingerly to one of the tassels. The tree went off simply like a rocket; in three seconds it was a roaring pillar of fire. Close by I could hear the shouts of those who were at work combating the original conflagration. I could see the wagon that had brought them tied to a live-oak in a piece of open; I could even catch the flash of an ax as it swung up through the underwood into the sunlight.

Had any one observed the result of my experiment my neck was literally not worth a pinch of snuff; after a few minutes of passionate expostulation, I should have been run up to a convenient bough.

To die for faction is a common evil;

But to be hanged for nonsense is the devil.

I have run repeatedly, but never as I ran that day. At night I went out of town, and there was my own particular fire, quite distinct from the other, and burning as I thought with even greater vigor."

Had Stevenson in the present unromantic day undertaken by similar means to satisfy his curiosity, he would doubtless have been shadowed to his lair by some efficient member of the Arson Squad, hailed into justice court, and very properly fined ten dollars and cost, with a stern warning thrown in. Cheap experience at such cost, we may reflect after reading again his entertaining account of the episode. Doubtless the sternest forest guardian, if he will read Stevenson, can forgive him his rash experiment with fire, in return for his interesting account of the incident.

NOTING the picture of a cluster of 19 pitch-pine cones in the August issue of *American Forestry*, Mr. William L. Worcester, of Intervale, New Hampshire, writes that he has had for many years as a curiosity a similar cluster of pitch pine cones containing thirty-two cones, found in his neighborhood long ago.



DIRECTORS STUDYING FORESTRY CONDITIONS

Dr. Henry S. Drinker (side view) and Charles F. Quincy, directors of the American Forestry Association and members of the Forestry Committee of the Chamber of Commerce of the United States investigating forestry conditions in the Pacific Coast Douglas fir forests.

MAHOGANY

BY JOHN J. BIRCH,

THERE is perhaps no wood more cherished for cabinet purposes than mahogany. Its fine tracery of dark and light brown lines, which become more and more pronounced with age and polishing, together with its freedom from warping or twisting in seasoning, has given it the high place which it occupies among furniture woods. It is a native of the tropics. Contrary to the prevalent belief it does not grow in great forests; but is sparsely scattered through the tropical jungles. A bulletin of the National Union of the American Republics states: "There is no such thing as a forest of mahogany. The pine loves its own kind, and never thrives better than when planted by nature or by man, one tree next to the other, for mile after mile, on plain or mountain. . . Other trees are found in groves or clumps, seeming to form little settlements within the woods. The mahogany tree, however, lives by and for itself alone; standing solitary of its species, surrounded by the smaller trees and dense undergrowth of the tropical forests, rearing its head over its neighbor." Very often only one or two trees may be found per acre.

The personnel of a mahogany lumbering outfit is the same in many respects as a lumber camp in any American forest, save for minor details. Belize, in British Honduras, is the chief exporting city for mahogany, and for that reason most of the outfits are made up from there.

The methods used in harvesting are exceedingly primitive, inefficient and relatively expensive. The cutting begins in the mid-summer, which is the rainy season. The tree hunter, or the one whose duty it is to locate the tree, is by far the most important man in the outfit. His first move is to pick out some elevated point and climb the highest tree and from there locate the mahogany. This is a comparatively easy matter, for at this season of the year the leaves of the mahogany have turned a reddish yellow hue, while the other trees are green, thus making a decided contrast, visible for a long distance. After having carefully noted his bearings, he proceeds to locate the trees. This is by no means an easy task, for in most places the underbrush is so dense that it is necessary to actually chop one's way through.

The trees are large and spreading with pinnate, shiny leaves. They range anywhere from fifty to one hundred feet high and are from ten to twenty-five feet in circumference at the base, depending on their age. It is the custom to build a platform, some eight or ten feet high, around the largest of the trees for the reason that the trunks are greatly enlarged at the ground. But by so doing, a great deal of the most valuable wood is lost, for it is here that the most beautiful graining and toughest timber is found. In felling, great care is taken so that the logs will not split or break. The trees are then cut into

(Continued from page 727)

THE FLOWER OF INDIAN SUMMER

BY BESSIE L. PUTNAM

When wandering along the banks of some stream in the last sunny days of the year, we may happen upon the pale yellow flowers of witch hazel, without question the last ones of the year. This is a large shrub or a small tree, sometimes reaching a height of 25 feet, but is never large enough to furnish wood of commercial importance.

The flowers are strap-shaped, and in small clusters at the axils of the leaves. Often the ripened fruit of the previous year appears with them, but more frequently it has been just scattered, and there remain only the twin wooly pods with empty sockets showing where the seeds have been. Though by no means showy, the flowers are interesting, matching in color the increasing yellow of the leaves. Yet though we may think of them as slow in appearing, are they not really in advance of the normal forest flowers? Examine the autumn formed buds of the maple and beech. You will find them ready in embryo to open with the first genial spring sunshine. The witch hazel just carries the process a step farther, and opens in late October or November.

Many plants have special facilities for scattering seed. In this respect, the witch hazel is unique. The pods of touch-me-not spring back, throwing the seeds quite a distance. The witch hazel bursts in a still more forcible manner, and the two shining black bony seeds are thrown very much farther. William Hamilton Gibson, who ex-

perimented much with them, declares that the momentum of the seed would commonly carry it twenty and often thirty feet, and "in one or two instances the diminutive double-barreled howitzers succeeded in propelling their missiles to the distance of forty-five feet by actual measurement." Those who wish to test the projectile power of the witch hazel have only to place a small branch with the unopened seed-pods in a warm room. In a few hours curious snapping sounds will be heard. These, when traced, will be found to be the horny seeds, thrown to all parts of the room.

In olden times the forked branches of this shrub were held in high repute as divining rods. No one would think of digging a well without first making use of them in pointing out the place where water could be found. If the witch hazel was not obtainable, a peach limb was sometimes used, but was considered less reliable. In old times, too, the Indians discovered medicinal qualities in the plant which are still credited to it, and through which we have now several reliable medicines.

It is a strange fact that while the flora of the Atlantic slope is radically different from that of the Pacific, some of our Eastern flowers skip over to Japan and are abundant there. Of the three known species in this genus, ours is native only to America while the two others are found in Japan. It is a cousin to the red gum, which has recently grown so popular in the furniture trade.

Indian Summer

It is the Indian summer. The rising sun blazes through the misty air like a conflagration. A yellowish, smoky haze fills the atmosphere, and a filmy mist lies like a silver lining on the sky. The wind is soft and low. It wafts to us the odor of forest leaves, that hang wilted on the dripping branches, or drop into the stream. Their gorgeous tints are gone, as if the autumnal rains had washed them out. Orange, yellow and scarlet, all are changed to one melancholy russet hue. The birds, too, have taken wing, and have left their roofless dwellings. Not the whistle of a robin, not the twitter of an eavesdropping swallow, not the carol of one sweet, familiar voice. All gone. Only the dismal cawing of a crow, as he sits and curses that the harvest is over; or the chit-chat of an idle squirrel, the noisy denizen of a hollow tree, the mendicant friar of a large parish, the absolute monarch of a dozen acorns.—Longfellow.

A New House

To-day on our street is a new frame house
Which the carpenters finished at noon; I see
That sawdust and shavings still litter the porch;
It is sweet to be built of a forest tree.

A house that is fashioned of brick or stone
May be fine. But from branches that wave in rain
And snow, that have shaded the violets,
That have heard all the winds and each bird's refrain,

That draw of their strength from the Earth's warm breast,
Have been touched by the sunlight and blessed by the dew,
Have awakened at dawn and have loved the dusk,
Their sweetness may enter the new house, too.

A home, I think should be built of the best
And a tree that has grown in the forest loam
Is the best material God could make
To be used by a man when he built his home.

—SOPHIE TUNNELL.

THE HALL OF FAME FOR TREES

THE trees pictured on the opposite page have been nominated for the Hall of Fame for Trees because of their connection with the history of America or for some special reason which sets them apart distinctively as objects of interest and so worthy of a place in this all-American gallery. The inserts are numbered and their description follow:

1. A great-grandson of Dr. Samuel Johnson, first president, in 1754, of King's College, now Columbia University, once owned the land on which this tree stands. The Oak is nominated by Miss Helen Harrison of Bound Brook, New Jersey. This tree stands about half-way between Stratford and Bridgeport, Connecticut, and experts say that it is 500 years old. A century ago it stood on a 300-acre estate owned by Edwards Johnson, son of Samuel William Johnson, who was a son of Dr. Johnson of King's College. The property changed hands many times, being owned by Joseph de Rivera, a Porto Rican sugar planter; the Lawrences; William Painter, and David Hollister. When the city of Bridgeport opened up the land, W. R. Bates bought the lot on which the tree stands and built a retaining wall about the tree to help save it.

2. Clifford Van Tassel, a tree specialist of Tarrytown, New York, describes this mammoth White Oak as the monarch of New York freedom. Mr. Van Tassel made this photograph, which is so indicative of the sterling qualities of oak—permanency and strength. The tree, which is 14 feet 8 inches in circumference at breast height, is 70 feet high and has the remarkable spread of 118 feet. A large stub recently removed from the trunk 35 feet up showed 112 annual rings. It is estimated that the tree was standing when the first white settler set foot on the soil that is now New York. It has been placed in nomination for the American Forestry Association's Hall of Fame for Trees by the New York State College of Forestry at Syracuse, New York.

3. In the beautiful Stewiacke Valley, in Nova Scotia, stands the Whip Handle Tree, nominated by John Creelman of Hillburn, New York. The tree has taken a beautiful vase-like shape, Mr. Creelman informs the Association; is about 3 feet in diameter and 75 feet high. This elm is over 200 years old, for, writes Mr. Creelman, "more than 200 years ago my great-grandfather, after a day of plowing, stuck his whip handle or ox goad in the ground at the end of a furrow. In those days oxen were used almost entirely for farm work, and the whip handle or goad had a sharp iron brad in the butt end to remind the oxen at times that more speed was needed." (Photograph by Cox.)

4. Here is the Mystery Tree of Flushing, New York. It is nominated for a place in the Hall of Fame for Trees by Everett P. Martin of Flushing. This tree stands in a field on the northerly edge of Flushing and is in charge of C. H. Rintleman. A nursery was on this spot 150 years ago, but when the tree was planted, or by whom, whether it came from imported seed or as a tree, is not known. The tree is 62 feet 8 inches high

and measures 75 feet from tip to tip. Seven feet above the ground it is 13 feet in circumference.

5. On this tree, just awarded a place in the Hall of Fame for trees with a history by the American Forestry Association, Daniel Webster hung his scythe and started for Dartmouth College. The nomination of the tree for a place in the Hall of Fame is made by Frank N. Hancock of Franklin, New Hampshire, who has lived in the vicinity of the tree for 60 years, and H. E. Zimmerman of Kansas City, Missouri. The graveyard in the picture is one in which are buried Webster's father and mother, as well as brothers and sisters. Webster was born on January 18, 1782. The path from that tree when Webster abandoned the farm work to seek an education led to the halls of Congress at Washington, to the laying of the corner-stone of the Bunker Hill Monument, to the Secretary of State's office, and to the position, in the opinion of many, of being the greatest orator the country has ever seen. Franklin, then called Salisbury, is the birthplace of Webster.

6. Here General Fraser, in command of the British at Saratoga, fell, and when he was shot the rout of the British forces was started. The tree has been nominated by Charles A. Ingraham of Cambridge, New York, who writes that "the second battle of Saratoga was fought October 7, 1777. This tree is a second growth from the original one under which General Fraser was sitting on his horse at the time he was shot. The British line of battle crossed the road. At about 3.30 P. M. the British were in a critical situation, their right flank having been forced back by Morgan's riflemen, one of whom, at the direction of his commander, fired at General Fraser. This calamity caused a panic among the British troops, for Fraser was held in high regard. The ground shown in the picture was quickly crowded with disorganized men, closely followed by the victorious Americans. The tree is about 14 inches in diameter."

7. When old New York was young this White Oak stood between Stony Brook and Setauket, in Suffolk County, Long Island. The tree has been nominated for a place in the Hall of Fame for trees with a history by Wilmot Townsend Cox of 34 Pine Street, New York City. The tree divides into many branches, Mr. Cox points out, and this doubtless is the reason the early day ship builders did not cut it down. As early as 1661 Setauket figured in history, for then it was that "ten coats, twelve shoes, fifty muxes, ten fadom of wampum and one pare of childs Stockins" figured in every purchase of land made by John Underhill, Richard Woodhull, James Cock, Andrew Miller, Richard Floyd and other settlers of Setauket. The famous old tree will never see real estate change hands at those figures again, at least not in that neighborhood. Lewis & Valentine inform the American Association that the tree is the largest on Long Island. It is a trifle more than 19 feet in circumference four feet above the ground.

(Continued on page 728)



A GROUP OF TREES, FAMOUS IN AMERICAN HISTORY, WHICH HAVE BEEN NOMINATED FOR THE HALL OF FAME. THEY ARE FULLY DESCRIBED ON THE OPPOSITE PAGE

WOODLAND FLOWERS OF THE PRAIRIE REGION

BY ARTHUR E. ELDRIDGE

ALTHOUGH the grain fields of the corn belt are very extensive still there are numerous small tracts of woodland. Along the river bottoms and adjacent ridges there are larger tracts, usually of heavier growth. Throughout this region much of the woodland is given to pasture for horses, cattle and hogs. Under such treatment the flowers and small shrubs disappear quickly, the open areas being invaded by grass and the woods becoming very bare and uninteresting by



A CARPET OF COLLINSIA, OR "BLUE-EYED MARY"
In Northern Ohio the beautiful Collinsia is a flower of May. It is not abundant, but grows luxuriantly on wet grounds, lowlands or flood plains.

comparison with the un-pastured areas.

Many people go to these tracts in the Springtime to enjoy the prospect: here an acre or two of bluebells, looking as if a piece of the sky had fallen; there on the hillside a thousand snowflakes of anemones, bloodroot, dutchman's breeches or trilliums.

By reason of the high valuation of land, owners are obliged to make economic use of the wooded areas. Sentiment for preservation of wild flowers, therefore, finds little room



CLAYTONIA, OR SPRING BEAUTY

This beautiful landscape effect is destroyed now, for two years after the photograph was taken all the flowers were gone, presumably due to pasturing.

in their sympathy. If, on the other hand, woodland is to be conserved for its products, pasturing is detrimental to development or growth. Forestry has been practiced little or none in many of the states until recently. Preservation of wooded tracts is essential for many reasons. One of the first is that people may have some objective in country travel; a place to enjoy meals out of doors, get acquainted with the wild flowers and give the children a taste of those things of which they get far too little in this region.

The spring flowers are abundant and beautiful. The most conspicuous are: *Collinsia verna*, *Anemone quin-*



WILD SWEET WILLIAM

This bit of unpastured woodland is now gay with wild phlox and May apples.

quefolia, *Claytonia virginiana*, *Mertensia virginica*, *Phlox divaricata*, *Trilliums*, *Violets*, *Erythronium*, *Dentaria*, *Sanguinaria*, *May apple*, *Dutchman's Breeches* and *Squirrel corn*. During the summer, woods with underbrush are not attractive, but with the coming of autumn there is a decided change. The foliage becomes more scanty and is taking on color, the fall flowers, mostly *Compositae*, appear in sunny spots, woodland borders and the flood plains. The dominant ones are *Joe Pye*, *Boneset*, *Sneeze weed*, *Sunflowers*, *Vervain*, *Veronicas*



THE DAINTY ANEMONE

This is a bit of lovely woodland, as yet unspoiled by pasturing. The pure white star flowers are sometimes tinged with blue.

and *Anemone canadensis*. Occasionally you find colonies of the Mist flower (*Eupatorium celestinum*); it is attractive and suitable for garden use. We can hardly omit those two important shrubs, the prairie crabapple



BLUE BELLS, OR MERTENSIA

This large colony of woods favorites developed in a clearing where the woods were cut the previous year. An early spring flower of the Middle West.

(*Pyrus ioensis*) and the thorns, *Crataegus coccinea*, *molle*, *crus-galli*, etc. They are so floriferous as to appear almost like large herbaceous plants. It is common to find a glade in the woodland with a solid border of crabs and haws. There are often fine specimens of individual haws scattered in the open area. When in full bloom the effect is very commanding and you feel as if some person had a hand in such a deliberate arrangement. Sometimes you will find in this region what might be called islands of trees. They may be from one to three acres in extent, consisting of an impenetrable border of interlaced crabs and thorns with a central portion of taller trees. All of these materials have been widely used in landscape work.

It is hardly expected that many people will set aside tracts for the preservation of wild flowers, but we do hope that the growing interest in forestry will bring about that desirable condition.

Many wild flowers once plentiful are now very scarce. The people should give intelligent support to the preservation of desirable areas so that utility shall not wipe away from the prairie all of its beauties.

WHAT IS FORESTRY ALL ABOUT?

BY THE OBSERVANT STENOGRAPHER

(Continued from page 688)

make the conversations I hear in the office. One man says this, another that. They talk about developments and needs and conditions, and give me information, but nowhere do I seem to get anything to fill me with a proper crusader's zeal or make me feel that the forestry problem is my problem. Perhaps this is why neighbors do not discuss the subject with neighbors, or Mr. and Mrs. Average Citizen fret over the depletion and neglect of the forests. But this is not surprising since no reform movement I can think of, except prohibition, and no subject of national importance, save war and baseball, seem ever to have more than a minority hearing. Dr. Frank Crane recently said he was curious to know why people were interested in legislation for the future, when they would soon be dead. So it is with forestry. Put a tax on our ice cream soda, and we rise to object, but tell us our future timber supply is at stake, and we say "how come," and go down to the movies.

So while there is much I cannot expect to understand about this forestry business, and many things difficult to reconcile, I'm going to write down as my lesson up to date what I've gathered from here and there and particularly my version of what a forester has told me. On one point it is agreed that the first great principle and the foundation of all else is protection of the forests from fire. In this, every single individual who escapes from the confines of brick and stone and lights a fire in anything more dangerous than the kitchen stove should be made to help, the penalty for digression to be roasting in any grass, brush, or forest fire he starts.

With forest fires controlled, if the wise legislators, foresters, timber owners and dear public ever learn how, we should encourage new forests to grow up naturally where they have been cut or burned, giving them such help as we can. Then as fast and as far as practical the foresters should apply their art so as to make better trees and more of them. Some day they may even be given money to plant trees where the land is waste. In short, as Professor Roth told us in a recent article, we should keep every acre of forest land covered with growing timber. Well, why don't we?

We can save at the other end, too, by using all of a tree after we cut it down, and making every stick serve a useful purpose. Careful selection for the use intended and treatment against decay where necessary, will make the supply go much farther.

There are a lot of other things, including some sane legislation and cordial cooperation, but these are for the foresters and lumbermen to work out. They must get together before the public can be expected to back them up or pay the bill. As long as one group of foresters says: "We must have a forest policy which absolutely prohibits the cutting of timber save under government control," and another group sides with the lumbermen and says: "Our constitutional rights prevent interference with our private property, and anyway the cut-over lands will reforest themselves if fire is kept out," you cannot expect the outsider to take much interest. People don't care much for this "you're a liar" business.

When we can be told clearly "what it is all about," and made to feel that a forest policy is a vital, urgent necessity for our national well-being because those who know agree as to what we need and why, I'll be one of many to feel like going out and preaching from a soap box to the multitudes, or to even write to my congressman; but just now I'm luke-warm, and listening.

My Friends, the Trees

The oak is King of the forest;
The birch is his Queen.
The pine is a sturdy squire
In garment of green.

Pear and apple are peasants,
Gnarled, old growers of fruit;
And the poplar is a gentleman
From nodding head to root.

The aspen is an actress
Who flirts with every breeze.
*There are all sorts of characters
Among my friends, the trees.*

—Julian M. Drachman.

NATURE STUDY IN OUR PUBLIC SCHOOLS

BY DR. R. W. SHUFELDT

(Photographs of figures 5-9 by the author.)

ONE of two things can happen to a civilized people following upon a great world war; they may either become brutalized by the experience and sink into an age of decadence, barbarity, and lawlessness, or they may maintain their vigor and stability, and, with a firm determination to rebuild the shattered structure of their civilization, rise superior to the brutality and destruction in which they have been engaged. When the latter course is chosen there is no surer and more gratifying index of it than to see the people go back to nature for their refinement, inspiration and rebuilding. This is what has happened in this country, to a large extent; and it is a most encouraging symptom when such a movement manifests itself, as indicating the soundness of the brains, morals and physique of the people.

Chief among these indications is the taking up of the study of nature—not only here and there as a pastime, but by students all over the country, and by its introduction into universities and colleges and into private and public schools. At this writing the study of nature, as it has come to be incorporated into the curricula of our public schools, has been a movement taken on by our educators and others, and through their energy and encouragement has spread over the country as a great wave of enlightenment from one end of it to another.

Having been a working naturalist for many years, and having during the past year conducted nature study classes in the public schools of Washington and the regular summer course lectures upon the same subject at the George Washington University, I have become thoroughly interested in this country-wide movement. Then, in order to obtain a broader view of the situation, I wrote for information, plans, booklets and photographs, ad-

ressing my communications to the superintendents of our public schools in various cities of the United States. The responses have been most gratifying and encouraging. I have also been favored by the Bureau of Education of the Department of the Interior, it having supplied me with a number of their recent Bulletins on this subject. One of these, on the "Reorganization of Science in Secondary Schools," is of especial interest and importance as touching upon this matter. Here the work of what was being accomplished along such lines and for further recommendations was referred to a Science Committee, composed of teachers of biology, chemistry, physics and general science in the public schools and other schools located in various towns and cities all over the country. This report makes a pamphlet of over sixty pages, and includes, or embodies, the

contributions and criticisms of more than fifty science teachers and administrative officers, approved by the reviewing committee of the Commission on the Reorganization of Secondary Education. Some of the suggestions set forth will be touched upon further on.

It would seem that a large number of the superintendents of our public

schools issue these schemes on the elementary course in science, each after his own fashion. As a rule, they are neatly bound in heavy paper, frequently carrying many half-tone illustrations devoted to the children in the classes, to school museums, specimens used in teaching, and to numerous other features of interest. On an average, these pamphlets carry fifty or more pages of printed matter—in the case of one or two schools over a hundred; occasionally charts and diagrams are incorporated. Among the most elaborate of these publications are from the superintendents of the public schools



FIG. 1. EDUCATIONAL MUSEUM BUILDING AT ST. LOUIS

The children composing a Nature Study Class are seen entering the main door with their teacher. Note the two large delivery trucks which are filled to their capacity twice daily.

of New York City, the District of Columbia, Philadelphia, Pittsburgh, St. Louis, Indianapolis — other cities issuing less formal printed schemes. There seems to be a very fair consensus of opinion on the part of the framers of these courses with respect to the grading of the instruction in nature study for the several school grades: the time allowed for its teaching per school day; the material to be employed;



FIG. 2. MATERIAL USED FOR TRANSPORTING COLLECTIONS

These are the boxes, trays and jars used at the St. Louis Educational Museum in sending out what is required at the Nature Study recitations in the public schools of that city.

the amount and character of the field work, and so on for other activities involved.

In a brief article like the present one, it will be quite out of the question to set forth the vast importance of nature study in our public schools, for its beneficial effects reach far into all lines of human activity. In an elementary way, it should be commenced in the first grade and, with increasing complexity and

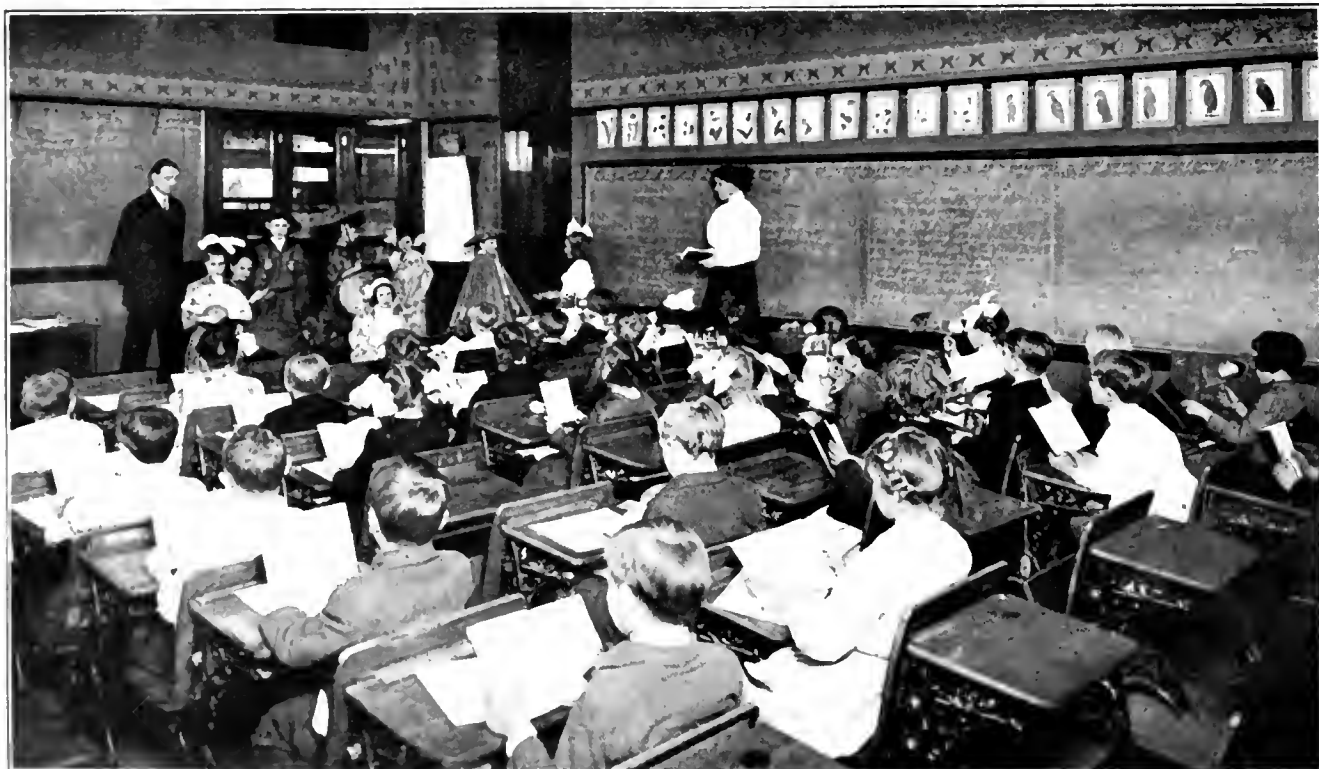


FIG. 3. A NATURE STUDY CLASS STUDYING JAPAN

Elementary ethnology is included in Nature Study in many of the schools. Note the fine series of birds and flower pictures arranged on the blackboards.

lengthened time limits, it should be carried, by trained and competent teachers, through all the grades to include the eighth.

There is no profession or calling in man's activity wherein a complete course in nature study will not be highly beneficial throughout life, in one way or another—that is, taken up as now given by the best teachers in our schools and the knowledge imparted in the proper way. Moreover, it links in with all the other studies set forth in the school curriculum—as literature, art, geography, arithmetic, manual training, language and civics. Through nature study man comes to comprehend his own position in the system,

might lie dormant throughout a lifetime. This for the reason that making pictures of natural objects is part and parcel of a course in nature study—at least it should be.

Every public school where nature study is taught ought to establish and cultivate a school museum of natural objects, and both teachers and pupils should be instructed in the matter of sustaining it and have it grow; its proper uses should also be constantly instilled into the minds of the scholars.

There is no single one of the regular professions wherein nature study does not enter sooner or later, and in a great many cases it comes to be a daily hap-



FIG. 4. GROUNDS OF THE UNITED STATES BOTANIC GARDENS

An admirable place to explore for a class in Nature Study, especially to study the rare trees. Here we may note the *Cedrus libani* on the left, and on the right a wonderful specimen of the European hornbeam (*Carpinus betulus*). Mr. George W. Hess, the present superintendent, is seen in the foreground.

in nature, and in his environment. It makes for health in the field work; it trains the mind in the matter of correct observation in all things; it cultivates the aesthetic taste, and leads one to read many books of many kinds. Further, it inspires the student to acquire knowledge and to use it after its acquisition; it ennoble the best qualities in our nature, and puts to shame the baser ones; moreover, it cultivates an appreciation of art, and brings out artistic qualities that

pening depending upon the calling. It stands to reason that a biologist, an explorer, a zoological artist, and a forester, would each and all would more frequently be called upon to use knowledge of this class than would a lawyer, a physician, or a priest.

The range of nature study is enormous, as it covers a consideration of all contained in nature on the face of the globe; this quite apart from the artificial struc-

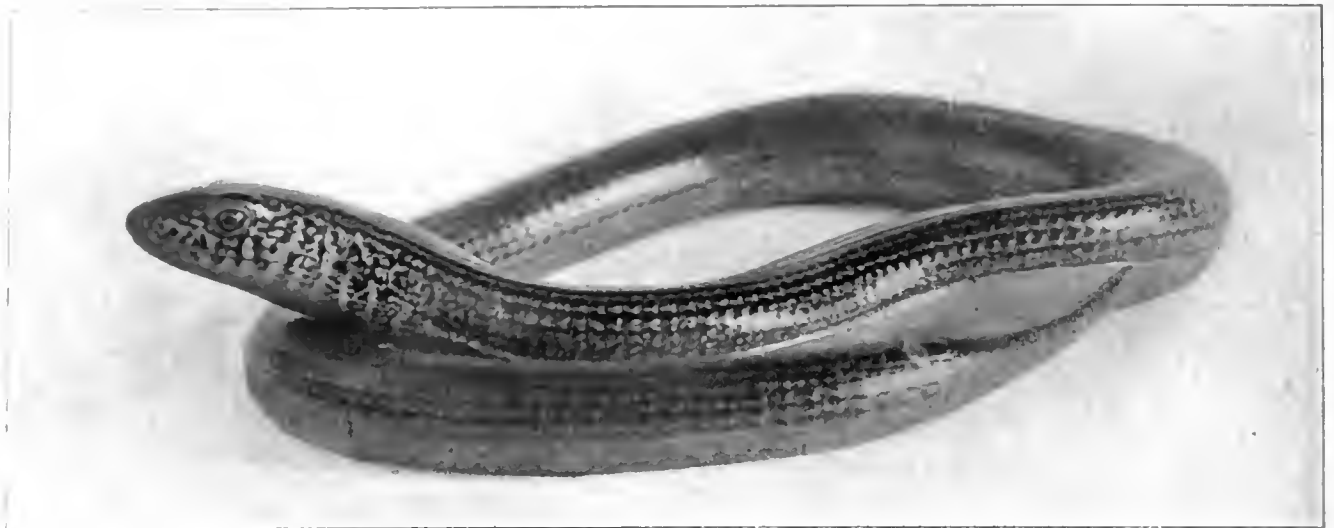


FIG. 5. LIVING SPECIMEN OF THE FAMOUS GLASS SNAKE

Excellent material to bring before a Nature Study Class; it is a limbless American lizard from Florida, and an entirely harmless one. To avoid capture, it frequently parts with its tail, which eventually grows out again; this has happened to the present specimen.

tures and arrangements found upon Earth as placed there by man—erected by him.

Where a city has its natural history museum; its well-equipped zoological garden; its botanical gardens; its nature laboratories, and its public aquaria, these are, each and all, of the greatest service to the teachers of nature study in the public schools of that city; and most American cities, containing the requisite populations to support such institutions, possess these adjuncts to civilization and progress.

In most of our public schools nature study and gardening, or elementary agriculture in its various departments, are more or less closely associated—indeed, the booklets that have been issued by the schools stand for this arrangement. The plan is an excellent one; but in this place only the readers' attention can be invited to the fact.

In a pamphlet of nearly seventy pages, Mr. Myron J. Walter, Director of the De-



FIG. 6. MANY MOTHS AND BUTTERFLIES TO STUDY
The well-known Luna moth from life, seen on side view. A Maryland specimen in the author's collection, and it is of a lovely pale green color.

partment of Nature Study and School Gardens of Pittsburgh, Pennsylvania, presents a course of nature study most valuable and interesting, and Mr. William M. Davidson, Superintendent of the Schools of that city, says in his preface to that course that the material outlined will, of necessity, be correlated by the wise teacher "with the proper branches in the school curriculum, particularly Geography and Language." Excellent advice is presented by Mr. Walter on "The Field Trip; the Museum; the Aquarium; on Charts and Calendars; on Correlation; on The Teacher, on Preparation, Application, Time," and so on. The recommendations for the study of plants, flowers, seeds, trees, insects, birds, and mammals, could hardly be improved upon, and all these subjects are fitted to the various school grades. Here is an example. Under "Insects" for the fourth year we read: "Review carefully the life history of moths and butterflies, also the differences be-

tween moths and butterflies. Make a study of the life history of the Codling Moth, touching on the economic importance and methods of control. Make an intensive study of the life history of the house fly. Obtain literature from the Local or State Department of Health and distribute to the children. Dwell particularly upon the fly as a disease carrier; and methods of control."

Foresters will be especially interested in the fact that in all of the schemes, from all of the cities, particular attention is paid to the study of our fruit, shade and forest trees; and as a matter of fact, on pages 47 and 48 of this admirable outline of Mr.

Walters', the study of the trees of the United States forests is given especial prominence, with very explicit instructions on nearly every phase of practical forestry. Animal life is taken up in the same systematic manner so that a child of good intelligence can not fail of having an excellent understanding of elementary biology along utilitarian lines upon completing the entire course in a Pittsburgh public school. More than ten pages are devoted to giving a list of the nature books on the various subjects taken up in the course; and this is an excellent idea, not to mention the great assistance such information is to the teacher. Since the above was published, Mr. William M. Davidson has issued (June 1, 1921), the new "Elementary Course in Science," prepared by Mr. John A. Hollinger, Director of the Department. Here the course is laid out in a most exhaustive manner, and the work is one of great value.

At this point I may say that I sent out a questionnaire to many of the school superintendents in different cities, receiving most interesting replies. Mr. Hollinger's answer goes to show the enthusiastic interest taken in the nature study course in the city of Pittsburgh by the community at large, by the teachers, and, as a rule, by the pupils. Among other things he says that the teachers "in nature study interest their classes to a high degree. Most of our teachers are enthusiastic and show considerable information concerning nature study. In addition, at least one-half of our schools or more have

some specimens of one kind or another. Many schools have rather large cases of specimens pertaining to Biology and Botany.

"The community is very favorable and enthusiastic, as is indicated by our Nature Study Club; Naturalists' Club; Hiking Club, Botanical Society, Audubon Society and other smaller organizations."

In September, 1909, a somewhat similar pamphlet to the above, tastefully gotten up, was issued by Mr. A. T. Stuart, the then Superintendent of the Public Schools of the District of Columbia; but it is not nearly so thorough as that which we find in the works referred to in a previous paragraph; as a matter of fact, it stands much in need of elaboration. In most of the suggestions presented, they are less than a skeleton of what is demanded.

From Indianapolis, Indiana, Mr. E. K. Ray writes me that their "Nature Study Course is undergoing completion;" and he was good enough to forward me a typewritten copy of what is soon to appear in the premises. It promises to be a very elaborate and valuable one, and is sure of contributing substantially to the literature of this subject.

In some cities, additional stimulation and more effective methods are much demanded along the lines here being considered; especially is this the case in such cities as New Haven and Chicago, and possibly others. Mr. George Wheeler, Acting Superintendent of Schools of the School District of Philadelphia, issues a booklet of some 119 pages for "The Course of Study in Geography and Nature Study in the Public Schools" of that city which is very



FIG. 7. CATERPILLAR OF THE LAUREL SPHINX MOTH (*Hyloicus kalmiae*).

Teachers aim to frequently bring before their nature classes specimens of the various caterpillars. This species feeds on the tomato and on other plants, and occurs from southern Canada to Georgia. Color, bright green with white markings.

thorough in treatment. The combination of nature study and geography is most admirable, not to say natural and necessary. In the "Foreword" to this brochure, Mr. Wheeler very truly remarks that "Geography is one of the great means by which we come to understand human life. It was formerly defined as a description of the surface of the Earth, and under that definition location was the most prominent aspect of the study. In later years the contents became much enriched by the

consideration of the characteristic flora, fauna, and peoples of the various regions, by a study of industry and commerce and of various physical phenomena. Still, however, the stress was laid upon description, and so long as this prevailed, geography could justly be called 'a composite of sciences' and not a true and separate branch of knowledge.

"As defined by modern education leaders in that study,



FIG. 8. GOLDENROD STUNG BY A PARASITE

Children can always be interested in such a specimen as is here shown, especially when the teacher explains how plants behave after having received certain injuries.

geography has a central idea of its own; that basic idea is the factor of relationship between the Earth upon which we live and the life which is lived upon the Earth. We may study on one hand the physical factors of situation, climate, topography and natural resources of a region; on the other hand the plant, lower animal, and human life which occurs in that region; yet we have not attained to true geography until we have discerned, in part at least, how the life which we describe is shaped and directed by the physical conditions of its environment. * * * Nature Study, beside being in itself a desirable portion of our curriculum, is also an essential preliminary to geography. The knowledge which is gained through nature study, the habit of observation which it fosters, the love of the beauty and plan of the

great outdoors, are all valuable for sane and complete living, and are also indispensable to a satisfactory basis for geographic thought.

"The value of geographic study was amply proved during the World War; a study of true geography is even more necessary in peace, as the economic relations of the world again approach normal conditions."

Too much cannot be said in favor of the valuable booklet Mr. Wheeler has added to the literature of this subject; indeed, it is a masterpiece in its treatment, highly indicative of American enterprise and advanced thought.

The Elementary Schools of the City of New York also has a wonderfully fine treatise on a "Course of Study in Nature and Environment," as adopted by the Board of Education on the 26th of June, 1918, and by the city's Board of Superintendents on the 18th day of May, 1920. It is entitled "A Syllabus in Nature and Environment," and treats the subject thoroughly and satisfactorily.

On the 8th of June, 1921, Mr. Eugene A. Nifenecker,



FIG. 9. A FIELD STUDY FOR THE CLASS

Here a common Pasture Thistle stands out in the clear; the class may assemble about it, the teacher telling them the story of its growth, its place in classification, how its seeds are distributed, and what insects visit it.

Director of Reference, Research, and Statistics of New York City and a member of the Board of Education, sent me a most interesting and valuable letter on this

subject. Many years ago, when I was living in New York City, I remember the large classes of public school children that visited the Aquarium at Battery Place, and the great pains the director of that institution, Doctor Townsend, and the late Mr. Spencer, took in demonstrating to those classes the lives of the fishes, and the theory of balanced aquaria. From Mr. Nifenecker's letter we learn that every possible advantage is given the children of the public schools of New York City to receive instruction in nature study, and to supplement that study by "visits to the museums, parks, and other places of interest." There are also well sus-

am indebted to Mr. F. L. Wiley, Assistant to the Superintendent of those schools, and to Miss Amelia Meissner, Curator of the Educational Museum of the St. Louis Public Schools. Mr. Wiley writes me, among other things, that "the St. Louis Public Schools maintain an educational museum, with delivery service to all the schools. We therefore do not have individual school museums" (May

31, 1921); and Miss Meissner writes, "we like to stress the idea that our object is to bring the museum to the schoolroom rather than have the school child brought to the museum." In the case of non-transportable material, the classes are brought to the museum. The St. Louis Department of Instruction separately publishes the "Pub-



ained Nature Rooms in the public schools of New York City; and, as a rule, the intelligent American part of the population is strongly in favor of maintaining the nature study course in the curriculum.

Judging from the material I have at hand on this subject—and it is quite extensive—it would appear that the public school system, in the matter of nature study, is, as organized in the city of St. Louis, far and away ahead of any other city in this country. And for the information on that point; for the fine photographs sent, and for the literature on the subject, I



lic School Messenger" for the information of teachers and pupils; this is now in its seventeenth volume, and is replete with all that pertains to the course in nature study in the schools in question; they also publish a brief on the "Educational Museum of the St. Louis Public Schools," which is by the way, a separate building, of ample proportions for the purpose

FIG. 10. NATURE STUDY ON THE PACIFIC COAST

Mr. Carroll De Wilton Scott, of San Diego, California, supplied the four photographs here shown. Upper: Natural History Museum Buildings, Balboa Park, San Diego, Cal. Below, to the left; Second Grade, Franklin School (mostly Mexicans), at the Natural History Museum in May, 1921. Right: Fifth Grade, Sherman School, at the Natural History Museum, May, 1921. Below: Fourth Grade, Francis Parker School, San Diego. Ready to visit the Museum, May, 1920. Mr. Carroll De Wilton Scott in the background.

outlined. This brief is a most remarkable little print of four pages, and sets forth the great advantage to be gained by having "a museum on wheels." This museum also has a library of 10,000 volumes. Every

public school teacher in the city of St. Louis has a catalogue of this library at hand, and by 'phoning for any particular book, he or she may have it delivered at once by automobile. The "Record of Delivery" of specimens to the city schools, by the same prompt plan, shows that during the years 1914-15 there was thus delivered 72,173 specimens, the same being returned to the museum building after the class demonstrations. The institution is financially very strong (\$11,709.52), while the annual expense per pupil is but 0.14¾.

The number of the individual collections in the museum is 1750, and 7000 individual and duplicate collections constitute the traveling museum. The number of lantern slides is 4000; stereoscopes 8000, colored charts and photographs 2000.

In the case of the "traveling museum," the material "is sent to the schools by a large automobile truck in the service of the museum. The schools are divided into five sections, each of which has a delivery day once a week. The principal of a school which has its delivery day on Monday asks his teachers on the preceding Friday to send him the numbers of all the collections in the museum catalogue they will need for the illustrations of their lectures during the following week. These numbers he inserts in an order blank for the curator, and on the following Monday the wagon delivers the material at the school, taking back at the same time the collections used during the previous week."

There are printed instructions how to best use this material, also a beautifully illustrated catalogue of the collection in the museum building. Other helpful and most excellent booklets and pamphlets are issued, and the entire system is certainly a most extensive and efficient one.

The District of Columbia, it would seem, could, in time, easily follow the St. Louis plan as above outlined; for it must have, in its various Federal museums, a perfect mass of duplicate material along every line required by the nature study teachers in the public schools of the Nation's Capital. It would seem, too, that it might be a good plan to utilize some of this material in this way, and thus throw a little life into what is now largely dead timber.

In New Brunswick, during 1920, there were 312 forest fires from all causes, burning over 94,787 acres, and representing a monetary loss of \$690,306.

DIFFERENCE BETWEEN MODERN RANGER AND PIONEER

Ex-Forest Ranger Robinson was recently quoted in one of the San Francisco papers as follows:

"Fellow named Robinson, who is in the Forest Service up Sonora way, postcards down that the only difference between the modern ranger and the pioneers is that while the latter blazed the trails, the former trails the blazes."

OAK AND ELM FORM REMARKABLE TWIN TREE

BY ROBERT H. MOULTON

WHAT may be called the "Siamese twins" of the tree world is found on an island, formed by two branches of the Mississippi River, at Rock Island, Illinois. The island in question, which is occupied by an arsenal of the United States Government, embraces some two hundred acres of luxuriant forest, comprising many varieties of trees, and almost in the center of it is the twin tree, an oak and an elm, the trunks of which having grown close together many years ago appear to be merged into a single bole to a height of five or six feet. At this height the trunks are entirely separate, each bearing its



THE "SIAMESE-TWIN" TREES

own peculiar bark formation and foliage. However, throughout the line of apparent merging into one trunk there is a clearly discernible line of demarcation between oak and elm, this being readily seen in the different sorts of bark. Apparently the trees were growing side by side when saplings. The twin tree has been estimated to be a hundred years old but is still of vigorous growth. It may have been noted by the Indians who once camped on the island, and it is even possible that the people had something to do, either by accident or design, with the remarkable formation.

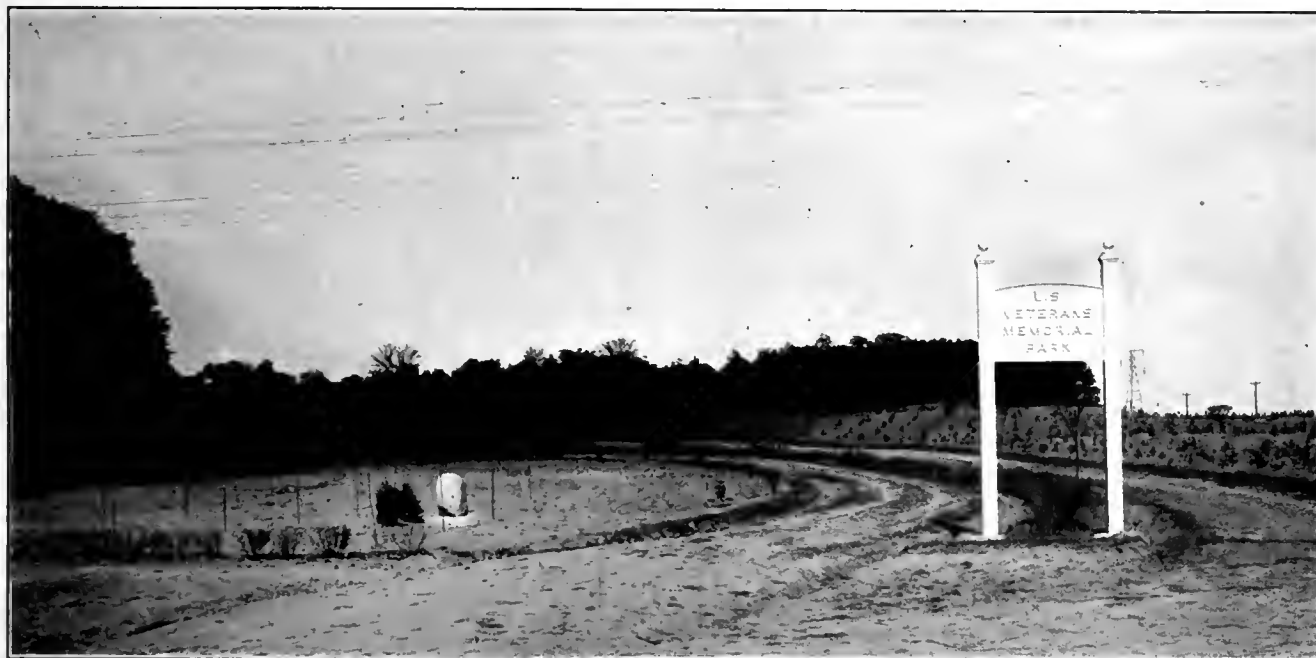
CHARLOTTE PLANTS MEMORIAL PARK FOR VETERANS

CHARLOTTE, MICHIGAN, has turned eighteen acres of unused land into a memorial park, and has set a fine example to other towns. In this park is a boulder, around which have been planted thirty-three gold star trees for the men of Eaton County. There are winding roads and shrub-lined paths that make a beauty spot. Charlotte thus tries to show to the world the glory of those who fought for her in the World War. She will not parade her mourning for that is a private affair with the individual. In this plot, known as the United States Veterans' Memorial Park, Mayor George M. Fenn, Sr., informs the association that seven thousand seven-year-old white pines have been planted. Then, too, there are a thousand hardwood trees, mostly maple and elm. Scattered about are one hundred butternuts and one hundred black walnuts. The roads in the park are lined with

tomorrow. Charlotte has placed before her future citizens and the world a memorial well worth while.

One of the last public acts of Col. F. W. Galbraith, Jr., commander of the American Legion, before he was killed in an automobile accident, was the planting of memorial trees at the intersection of the Dixie and the National Highway at Vandalia, Ohio. The planting of the memorial trees was a part of America Day program in which Col. Galbraith had made a rousing Americanization speech.

Fifteen American elms were placed. This step signifies Dayton's cooperation in the campaign launched by the American Forestry Association to beautify the highways with trees. Tributes to the "unknown dead," to the fallen soldiers, sailors and marines were expressed in



Photograph by Roehm

GOOD EXAMPLE SET BY CHARLOTTE

What was once a tract of land that nobody bragged about is now a beautiful memorial park. The work was done by the pupils of the schools and the citizens of Charlotte. The American Legion had a big part in the ceremony and Mayor Geo. M. Fenn, Sr., was one of the speakers. In the tract seven thousand seven-year-old white pines, one thousand hardwood trees, maple and elm, one hundred black walnuts, one hundred butternut trees and a grove of red oaks were placed. In the center of the red oak grove is a memorial stone in honor of the men from Eaton County who did not come back after answering their country's call to the World War. There are thirty three of these memorial trees which Mayor Fenn has registered on the national honor roll of the American Forestry Association. The roadways through the park have been laid out and lined with varieties of shrubbery while a hedge runs along the side of the park, which adjoins the main street of the town. In the years to come Charlotte will have a memorial she will be proud of, for it is one in the creation of which all her citizens had a part.

honeysuckle, lilacs, the flowering quince and other varieties. The city of Charlotte has done well, much better than by the erection of a stone shaft. Here Charlotte sees the consummation of community endeavor, for it was the community that did the work. Here each year Charlotte can rededicate herself to the ideals for which her sons fought. Here Charlotte can gather and take up any question of community endeavor. Her work has just begun. The children and the young men of the American Legion and other organizations, that had part in the park dedication, will be the citizens and the veterans of

the four trees representing the Dayton branch of the American Forestry Association. A fifth, offered by the Burroughs Nature Study Club, was dedicated to the memory of nurses.

Uniformed troops of Boy and Girl Scouts were present at the ceremonies, in which the Dayton Federation of Women's Clubs, the Horticultural Society, Rotary and Kiwanis Clubs, Advance Club, Woman's Press Club, Council of Jewish Women, the Aurean and Geographical Societies of Steele High School and Vandalia were represented.

Exercises centered around the tree dedicated to the "unknown dead", the first to be planted. Arrangements for the day were in charge of Clarence O. Siebenthaler. An address by Prof. William A. Werthner was followed by an invocation. Mayor Pease gave the greetings from



Maywood and Howard

COL. GALBRAITH PLANTS MEMORIAL TREES

Col. Galbraith is the man in the overcoat, speaking at the memorial tree planting at Vandalia, Ohio.

Vandalia. Colonel Galbraith gave the main address. He was followed by S. S. King, who spoke for the Forestry Association, and by Miss Irma Gerkins, who represented the women of the country. A few moments of silent prayer and the singing of "America" concluded the program.

THE SUCCESSFUL WOODLOT

IN order to make a real success of the farm woodlot it is necessary to know what trees to plant and how to grow them. Many plantings of trees have turned out failures because of the selection of species unsuited either to the climate or to the soil. The best trees for planting on a home farm usually are those which grow well in similar soils in the region, according to the recommendation of forest specialists of the United States Department of Agriculture, in Farmers' Bulletin 1123, "Growing and Planting Hardwood Seedlings on the Farm," which may be had by application to the Department.

In determining what species of hardwood trees should be grown, the bulletin says the object of growing the trees and their adaptability to the climate of the region should be kept in mind. As an illustration, boxelder is not a good tree to plant for timber; the yellow poplar, because of climatic conditions, can not be grown successfully in the plains region of the central United States, and hardy catalpa will not thrive in poor, sandy, or heavy clay soils.

To a certain extent trees may be grouped as those most valuable for lumber, for posts and poles, for windbreaks, etc. Some of the varieties listed as suitable for lumber are: Ash, basswood, beech, birch, black cherry, cottonwood, cucumber, elm, hickory, sugar maple, red oak, white oak, red gum, sycamore, black walnut, and yellow poplar. Varieties suitable for posts and poles are: Hardy catalpa, coffee tree, red elm, eucalyptus, black locust, honey locust, Russian mulberry, oaks, osage orange and white willow. Varieties best suited for windbreaks are: Green ash, boxelder, cottonwood, eucalyptus, hackberry, silver maple, Russian mulberry, osage orange, Russian olive, white willow and yellow willow.

A mixture of two or more kinds of trees in a plantation sometimes is desirable, says the bulletin. For best results, trees such as the cottonwood should be spaced widely, while others, such as black walnut and black locust, have such scant foliage that their shade does not prevent the growth of a heavy sod. A mixed planting of cottonwood with either of the other two varieties mentioned will more completely utilize the ground, increase the yield, and bring about a better forest condition. Frequently, less expensive and less valuable varieties can be planted as fillers with trees that are to make up the permanent planting. Mixed plantings also are desirable as a protection against diseases and insect attack.

Unless intended for windbreaks, plantations should be located on the poorest soil of the farm, that least suited to the production of agricultural crops. Odd corners cut off by streams or driveways and hillsides or poorly drained soil should be selected. In starting a grove, seedlings one or two years old are preferable to seed or cuttings. Nut trees, such as walnut, hickory, and oak, develop a deep taproot and few lateral feeding roots during their first year. They can not, therefore, be transplanted as successfully as other trees. The nuts or acorns should be planted on the permanent site. Sometimes it is advisable to sprout the nuts before this planting is made. Cottonwood and willow plantations are most easily started with cuttings—12 to 14-inch sections taken from one or two-year-old twigs of living trees. Cuttings should be collected during early winter and buried in moist sand in a cool place preparatory to planting in the spring.

In general, early spring planting is preferable to planting at any other season. As compared with fall planting, it has at least two distinct advantages—the stock has an entire growing season in which to become established before it is subjected to the rigors of winter, and it is not in immediate danger of being heaved out of the ground by alternate freezing and thawing.

MAHOGANY

(Continued from page 710)

convenient lengths to be handled and squared so that they can be more easily stowed away in ships.

By this time the dry season has begun, and while a part of the gang are engaged in cutting, others are at work preparing roads and bridges to enable the logs to be transported. The trucks used for hauling are two-wheeled affairs, constructed on the spot, save for the axles and hubs, which are brought in by the lumbermen. Oxen are used to haul these improvised wagons. The work is done mostly at night, by the aid of pine torches, for the reason that it is cooler at that time. The logs are collected on the banks of the rivers and left there until June, when the rainy season sets in. At that time they are cut loose and allowed to float down stream. A gang of natives in flat bottomed canoes follow the logs to see that none are lost. When they have arrived at their destination, each owner collects his logs, which are marked by certain distinguishing marks on the ends. They are then prepared for export by cutting off any battered ends or split portions. The natives tie them together and raft them to the ships, where they are placed aboard. This is a dangerous operation, for in rough weather, many of the rafts are broken up and the timbers carried out to sea. In the majority of cases they are carried by ships to London, which is the mahogany center of the world, and from there dispersed in smaller quantities.

The wood is generally classified under

two heads: the Spanish Mahogany and the Honduras mahogany. The former composes the richly colored, solid, heavy varieties, which are sought after chiefly for furniture veneering. It is susceptible to a high degree of polish and when properly treated, a rich wavy figuring is brought out. The Spanish wood is the produce of the island of San Domingo, whence only small quantities come at the present time. Cuba furnishes a much larger log, which is only slightly inferior to the San Domingo, and is classed as Spanish wood. It can be partly distinguished by the white chalk-like specks in the pores and is cold to the touch.

The Honduras mahogany is lighter, open grained and more uniform in color; almost devoid of figuring or curl. There are black specks or lines in the grain, which are characteristic only of that variety. It is valuable where a sound straight timber free from all tendencies to warp is required. Alkalies are often applied to this, especially to the lighter colored wood, in order to deepen the shade, and in this way it sometimes replaces the better grade of wood.

The logs are often forty feet long and from two to three feet square. They are obtained from the low, moist land and are generally soft and coarse. This variety is used as a foundation on which to veneer the finer varieties, and from its spongy nature it is admirably suited for this purpose, for the reason that the pores aid the glue in adhering. Aside from this, it finds a large use in pattern making, small turning work and shipbuilding. The trees

growing in the North, near the Mexican border are much more dense and solid than the lowland timber.

Some authorities have supposed the Honduras to be a different species from the Spanish because of its lighter color as well as the porous texture; but it is now believed that these differences arise from the different situations in which the trees are found.

In Mexico, the mahogany tree attains its greatest dimensions. Squared logs of from forty to forty-eight inches are infrequently obtained, although the average are from fifteen inches to three feet, cut in lengths of from eighteen to thirty feet for convenience in shipping. The wood in general is plain and somewhat soft at the core, resembling the swamp variety of the Honduras wood, and although timber grown on the upland provinces, especially Tobasco, is firm, solid, and not unfrequently richly figured.

A carpenter on Sir Walter Raleigh's ship is credited as being the first person to have noticed the superior qualities of the wood. He was attracted to it because of its great beauty, hardness and durability. Dr. Gibbons, a physician of London, in 1720, was presented with several planks brought from the West Indies. He employed a cabinet-maker named Wallaston, to construct some small articles from this wood, and dating from that time it has been highly cherished as a cabinet wood, due to its soundness, large size, uniform grain, durability, beauty of color, richness of figure, which is improved by age, and the ability to take a high polish.

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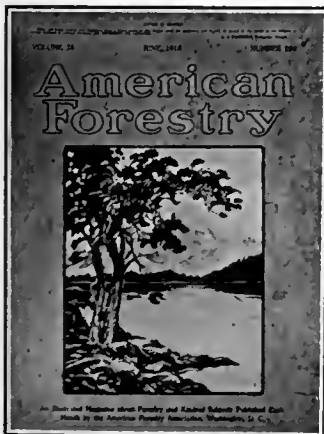
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PRESIDENT ACCEPTS MUIR WOODS

On September 22, President Harding by public proclamation accepted and added to the present Muir Woods National Monument, California, 128.14 acres of land, gift to the United States from former Congressman and Mrs. Wm. Kent of California and from the Muir Woods and Mt. Tamalpais Railroad. This is probably the first instance on record of a railroad deeding lands to the United States as a gift. The Muir Woods, a notable grove of redwood trees, (*Sequoia sempervirens*) became the property of the United States on June 9,

1908, when former President Roosevelt accepted 295 acres from Mr. and Mrs. Kent and proclaimed the area a national monument. Located on the south slope of Mt. Tamalpais about seven miles in a direct line across the bay from San Francisco, it contains numerous redwood trees, reaching to a height of 300 feet and having a diameter at their base of 18 or more feet. The area affords recreation and pleasure to thousands of persons living in San Francisco Bay section and is visited by persons from every section of the United States.

HALL OF FAME FOR TREES

(Continued from page 712)

8. One hundred and fifteen years ago this year the Lewis and Clarke expedition camped beneath this Council Oak, nominated for a place in the Hall of Fame of the American Forestry Association of Washington by Mrs. Susie Brown of Marion, Iowa. This great burr oak is at Sioux City, Iowa, and experts say it was 150 years old when Lewis and Clarke saw it on their way to the Pacific Coast and there held council with the Indians.

9. This oak, planted to mark a signing of a treaty of peace with the Indians, is nominated by Charles A. Ingraham of Cambridge, New York. The tree was planted in 1676 by Sir Edmund Andros, Colonial Governor of the Province of New York. The planting confirmed the signing of a treaty with the Schaghticoke and other Indian tribes. The Governor was accompanied by a body of the King's militia and many eminent men in the affairs of the colony. In the party were a thousand warriors, and the ceremony was the most imposing ever held in the Hoosac Valley. After the Indians left to dwell at St. Regis, in Canada, Queen Esther came annually with her Schaghticoke warriors to the former hunting grounds, where they danced about this "Tree of Peace" and placed flowers on the graves of their warriors. This tree, on the Knickerbocker homestead at Schaghticoke, has a girth of 18 feet at a distance of three feet above the ground.

RED SNOW IN THE ROCKIES

Red snow which has made its appearance in many sections of the Rocky Mountain National Park this summer has attracted wide attention from the thousands of tourists who have visited this national playground, says an official bulletin.

The red snow is seen to the best advantage during the motor drive over the new Fall River Road which crosses the Continental divide reaching an elevation of over 11,700 feet above sea level. Many are the explanations offered by tourists and those who have seen the snow at about twilight stoutly maintain that its pinkish color is due merely to the reflection of the setting sun.

Knowledge of the real cause adds interest to this curious phenomenon. The great masses of color which appear in the large snow fields in the higher elevations result from countless billions of tiny organisms, which have the power of movement, growth and reproduction; a microscopic plant, (*Protococcus nivalis*.) Like many other low forms of life this one has characteristics of both the animal and vegetable kingdom, and belongs strictly speaking to neither.

A close inspection discloses that the color is concentrated in the hollows of the

turrowed surface of the snow, and reaches its maximum density about one-quarter inch below the surface. A slight scraping will produce in some places streaks of almost blood red. On the tongue its flavor suggests watermelon. A handful of snow, taken up and allowed to melt away will leave a powdery red stain.

Essentially an Arctic species, *Protococcus nivalis* has introduced itself into the United States within the past decade. It is now found in Glacier and Mount Rainier National Parks. So far as known it has not been reported in other sections of Colorado. It is somewhat of a mystery how the spore is carried over such great distances. Possibly it is borne on the Chinook winds.

FREIGHT ON LUMBER.

The New York State College of Forestry referring to a statement made by Colonel William B. Greeley, chief forester of the United States, that it now costs Chicago \$22,500,000 more a year for freight on lumber than it did thirty years ago, inquires thirty years hence what will freight on lumber cost Chicago? If it costs the windy city such an enormous sum a thousand miles nearer the supply, what will it cost New York in another generation? The country's annual freight bill on lumber is now \$200,000,000 and when the southern timber supply is exhausted, as it will be at the present rate of consumption in eight or ten years, the entire nation will have to obtain lumber from the Pacific coast states, Oregon, Washington and California. It is estimated that the annual freight bill for the nation will have increased about 400% at that time, in other words, the people of this country will be paying \$800,000,000 for freight on lumber.

HOW TO TELL BIRCH, BEECH AND MAPLE APART

BIRCH, beech and maple are very similar in appearance and have approximately the same weight. Hence it is comparatively easy to mistake one of them for another. A method which anyone can use to distinguish them is suggested by the United States Forest Products Laboratory. The method makes use of the relative width of the pores and medullary rays in the three woods.

If the end grain of birch, beech or maple is cut smooth with a sharp knife and examined with a hand lens, the pores will be seen as tiny holes distributed fairly evenly over the surface, and the medullary rays will appear as narrow lines of a different shade running at right angles to the growth rings.

In beech some of the rays are very distinct even without a lens. The large rays are fully twice as wide as the largest pores.

In maple the rays are less distinct, and are considerably larger than the pores in

the largest are about the same width as the largest pores.

In birch the rays are very fine, invisible without a lens. The pores are several times larger than the rays, usually being visible to the unaided eye as minute holes on the end grain and as fine grooves on dressed faces of the board. The pores in birch are considerably larger than the pores in beech or maple.

The appearance of the medullary rays on a "quartered" surface is also distinctive. Here they appear in beech as distinct "flakes," the largest being between one-sixteenth and one-eighth inch in height when measured along the grain of the wood. In maple they are considerably smaller, rarely attaining a height of one-sixteenth of an inch. In birch they are comparatively inconspicuous.



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"THE FOREST PRESERVES OF COOK COUNTY"—This valuable report of activities on and administration of this wonderful tract, owned by the Forest Preserve District of Cook County, Illinois, is a splendid tribute to the men responsible for the development of this highly important public service work. The people of Illinois have good cause for pride in the possession of this forest preserve, for the wise foresight and public spirit which made its acquirement possible, and for congratulation on the sane and practical manner in which the project is being developed.

"LONG LIFE FOR WOOD" and HOW TO MAKE FARM TIMBERS ROT-PROOF—two Carbosota booklets just off the press, are full of valuable information. The first describes the many uses to which Carbosota may be put, explaining the several methods of its application. The second points out to the farmer how he can save his buildings and all wooden structures from decay, describing and illustrating what rot of wood really is and how he may protect himself against it.

The California State Board of Forestry has acquired 30 acres of land on which they are raising trees for highway planting.

BOOK REVIEWS

Material Handling Cyclopedia (New York)
\$10.00.

This is the latest addition to the library of transportation literature, and its purpose is to bring together in a single volume complete and practical working information about the many types of material-handling devices used in industry. Its publication, instigated by the engineering departments of various material-handling machinery manufacturers and of terminal and industrial engineers, will fill a long felt want in providing in readily accessible form all information available on material-handling machinery and methods, which heretofore has had to be sought from various sources.

"The Spell of the Rockies," by Enos A. Mills, Houghton-Mifflin Company, is just what its name implies. The author deals with his experiences in camp, on trail, in the forest and on the mountains of the West, narrating what he has to tell in a manner both interesting and instructive. Few writers are as well informed about western conditions as Mr. Mills and it is always a treat to read his books.

"The Story of a Thousand-Year Pine", by Enos A. Mills, Houghton-Mifflin Company, is a booklet telling with charm and grace the life story of a yellow pine in one of the Western forests.

"The Conservation of Wild Life in Canada," by C. Gordon Hewitt D. Sc., Charles Scribners Sons. Declaring that on the American continent it is only in Canada that any important part of the original wild life remains Mr. Hewitt proceeds to make a survey of the wild life together with an earnest and compelling plea for concerted action in the endeavor to conserve and preserve our fast disappearing wild creatures.

"Manual of the Trees of North America," by Charles Sprague Sargent. Illustrated, \$12.50.

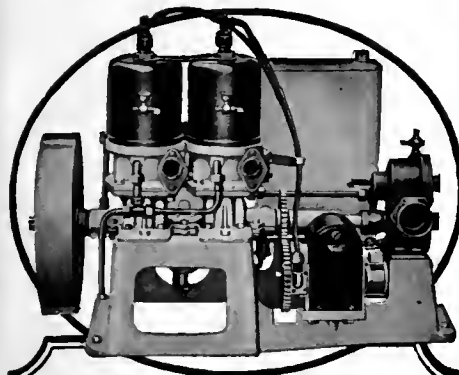
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AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail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



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CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PAST PRESIDENT CANADIAN SOCIETY OF FOREST ENGINEERS

The progress being made toward practical and rational management of the Government forests in Canada is most gratifying. It is however only in its embryonic stage and much work needs to be done. Of course the first and most important thing is fire protection and this is receiving more and more attention. Five years ago a summer like the past would have caused enormous destruction, but in spite of the weather and the numerous fires the loss of valuable timber was not large. Much has been done during the past season by airplanes, not only in locating and reporting fires but also in carrying men to put them out. Aerial work will certainly increase in importance and value very rapidly in this country owing to the great extent of forests and the very meagre means of communication.

The second great need is for an inventory of our forest resources. We must know where the northern limit of merchantable timber is and also the eastern. Offerings of timber properties in Labrador are from time to time coming on the market and there seems to be no reliable information as to whether there is any timber there or no. Some reports say that there is enormous wealth and others that there is timber only on the rivers and surrounding the lakes and that the hills are quite bare. Many people when they hear of the rapid depletion of our forests turn over in bed with the comforting thought that we shall only have to go a little farther north to get all we need and want. We must know the areas which have been burnt over and whether they are being naturally reforested or not. The areas already cut over must be mapped and the probabilities of a new crop ascertained. It seems fairly certain that one third of the original forests of Canada have been burnt, that is, are not now covered with merchantable timber, or with timber that will be merchantable in a generation. Here again the airplane is doing yeoman service and it is only by its help that we can get the above information in time to influence our legislators to the necessity of making long time plans for the proper use of the forests.

Knowing approximately the amount of timber which we have and the annual consumption we can at once bring the whole forestry problem from the realm of opinion and conjecture down to the basis of fact and business necessity. Knowing how many acres of merchantable timber we have, how much is cut-over, how much is burnt, and about how much is likely to be burnt each year, and knowing the annual

consumption we can say that we will not reach the end of our supply for a century. In which case the lumbermen and the general lumber using public can do the worrying. If however, it appears that our supply will be exhausted in fifty years or less then the pulp and paper manufacturers and the newspapers will begin to get excited and there will be not only fireworks but constructive action. Fortunately since the majority of timber lands in Canada belong to the Provinces each one of these has only to say, "Gentlemen, you are using our timber faster than it grows, we must reduce your allowance." There will be no question of "mandatory" legislation or invasion of property rights. In Canada, a very large amount of revenue in several of the Provinces comes directly from the sale of stumpage and a decrease in the amount of timber cut means a decrease in revenue and a consequent increase in taxation. The question is vital and comes home to every citizen. Therefore the question is, if we have only timber enough for fifty years, what are we going to do about it, not fifty years from now, but at once? What is the proper, business-like and commonsense way to handle the problem? In Europe it has been abundantly proved that you must spend money on your forests if you want to increase your revenue, just as you do on a farm or in a manufacturing plant. You must get the largest possible amount of timber from each acre. Many people seem to think that because a pulp or paper company has large timber limits, several thousand square miles, that they are in a strong position and have plenty of raw material for the future. This does not follow. There may be large burnt areas, large areas of swamp or water, it is a case where timber per acre is the important point. It does not take a financial genius to understand that it is better to have one square mile of land carrying 20 cords of merchantable timber to the acre within fifty miles of the mill than to have seven square miles carrying three cords of merchantable timber one hundred and fifty to three hundred miles away. There seems to be an idea that it is better business to have large areas of poor timber several hundred miles away from a mill than to take care of future requirements by planting right at the back door of the mill. Our Governments are at present selling the right to cut timber with practically no regulations which will insure the future productivity of the forest and with absolutely no regulations which will improve its condition or keep it on a basis of sustained yield. The amounts spent on

fire protection and inspection are ridiculously small. No planting on a really commercial scale is being done. They are living on our capital. However signs are not wanting of a public awakening, brought about in large part by the far-sighted self interest of the pulp and paper industry. Their position is that they have an obligation to their stockholders to keep the plants running, to the region, to see that towns and country districts which have been developed as a result of the establishment of their plants, do not go the way of the saw-mill towns of Pennsylvania and the Lake States, and to the Provinces which by the lease of water-powers and timber limits make their existence possible. After all true patriotism is good business.

The Forestry Branch News Letter, No. 194, issued by the Dominion Government is an interesting and well gotten up sheet and shows the attitude now being taken by the Dominion and Provinces of getting the people at large interested in public questions. The people must become interested in the people's business and once their interest is aroused progress will be rapid. The Government of Ontario is doing the same thing by carefully prepared matter issued to the newspapers giving the public information and instruction in forest fire protection and tree planting.

A new form of "Shanty-book" has just been issued for the Quebec Department of Lands and Forests. A "Shanty-book" is a book which is issued to jobbers working on Crown Lands, in which they are required to enter the number of logs cut each day. Each time the scaler measures the logs cut he must copy his record into the "Shanty-book" and this must be open at all times for inspection by the Forest-Ranger. The regulations governing the cutting of timber are printed in the front of the book and the penalties for infractions with them in red. Information as to the general value of the forests to the public are set out on the inside front cover, together with advice as to avoiding forest fires and the reasons for not wasting timber. Forms for affidavits of those using the book are included and on the back is printed a poem by Andre Theuriet called the "Benefits of the Forest".

Mr. C. E. Lane-Poole Chief Forester of Western Australia, has finally received authority to go ahead with the establishment of a forestry school for men wishing to enter the forest service. There will be a school in the central region of the forested area for apprentices under the control of a higher grade instructional officer. The course will cover four years and will combine theoretical and practical work, four to six months being spent on theory and the rest of the year the students will be attached to assistant foresters for instruction in practical work. During the training the students will receive wages and at the end of the course those who

pass the examinations will enter the service as forest guards and will work up to Assistant-Forester and then to Forester.

The cooperative work on Forest Investigation at Lake Edward, under the direction of Mr. Robertson, for the Dominion Forestry Branch and the Laurentide Company is now under way. Sample plots are being measured again and in some areas of natural reproduction where the spruce and fir have come in very thickly and have reached a height of four to ten feet, plots of one to two acres in extent have been laid out and the trees thinned out so that they will stand four feet by four feet and eight feet by eight feet. The influence of this thinning will be studied with natural plots as controls.

CONFERENCE IN WASHINGTON

A Forestry Conference was held in Seattle, Friday, October 21st, the purpose of which was to lay the foundations for a sound state forestry policy for the State of Washington. It was conducted under the auspices of the State Development Bureau of the Seattle Chamber of Commerce and Commercial Club and was presided over by Dean Hugo Winkenwerder of the University of Washington. An interesting program of addresses and discussions filled the day and the Conference ended with a dinner in the evening. The enthusiasm and interest aroused during the sessions argue well for the future of forestry in the State.

INTERESTING REDWOOD NOTES

Mr. C. A. Reed of Santa Cruz, California, sends the following interesting observations concerning two redwood trees (*Sequoia sempervirens*) cut on the old Grover ranch between Soquel and Aptos Santa Cruz County. The two trees were three and four feet in diameter respectively and on one he counted seventy-eight rings and on the other ninety-three. Instead of the inner rings being wider and the outer narrower as has been the case on all other trees where he has counted the rings, the inner rings of these two trees were not over one sixteenth of an inch wide and the trees showed very little growth until they were forty or fifty years old. From that time on the growth was rapid and the outer rings showed an annual growth of one fourth to three eighths of an inch. These two trees had come from seeds and not from sprouts surrounding a tree that had been cut as had been the case with the other trees on which he counted the rings, so the inference is that it took them forty or fifty years to overcome an unfavorable environment and get a good start.

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GEORGIA FORESTRY COMMISSION
BUSY

This Commission, created at the last session of the Legislature, has begun activities, looking to the conservation of Georgia's forest resources, in earnest. Though no appropriation was made available for its work, voluntary contributions from enthusiastic citizens have made it possible to go ahead. C. B. Harmon, secretary of the commission, points out that unless immediate action is taken to preserve the present timber and protect the young trees already growing, all Georgia lumber will have to be imported at high prices, made higher with the freight rates.

The Legislature authorized the appointment of an investigative committee to report on forestry conditions in the state, and the Governor appointed J. H. Mills, of Jackson, representing the farming interests; E. M. Thorpe, of Townsend, of the pine belt; Mrs. Robert Berner, of Macon, a prominent club woman; Bonnell H. Stone, Blairsville, hardwood section; M. L. Brittain, State School Superintendent; J. Phil Campbell, Athens, Director of Extension; L. W. McCalla, State Geologist and Mrs. Lollie Belle Wylie, Publicity Chairman.

An ambitious program already mapped out by the Commission includes the circulation of literature to every citizen who is interested in forest conservation in the State.

SYRACUSE WELCOMES NELSON
BROWN

Nelson Courtlandt Brown has returned to his former work as head of the Department of Forest Utilization at the New York State College of Forestry at Syracuse.

Mr. Brown left the College in May, 1917 to accept an appointment as Lumber Trade Commissioner of the United States Department of Commerce and the National Lumber Manufacturers Association to investigate the effects of the war upon the lumber trade of Europe, the results of the destruction of the forests to maintain the fighting armies along the various fronts and the possible needs for American lumber after the war. In connection with this very important work Mr. Brown toured all the principal lumber producing sections of the United States and Canada, with the Lumber Commission, and spent two years in Europe. He was a great deal of the time along the active fighting fronts in France, Italy and the Balkans, and investigated forestry practice and the lumber industry in Great Britain, France, Belgium, Spain, Italy, Greece, Serbia and portions of Northern Africa.

Colonel W. B. Greeley, head of the Forestry regiments and Chief of the United States Forest Service, arranged to have Mr. Brown transferred from the United States Department of Commerce to the War Department, and while in this position as Civilian Engineer of the American Expeditionary Forces, he purchased in Spain lumber, railroad ties and other supplies for the United States Army.

As a result of his investigations, Mr. Brown has published two monographs through the United States Department of Commerce, "The Lumber Market and Reconstruction Requirements in Italy" and "The Lumber Market in Spain and Portugal." He recently issued a book entitled "Forest Products, Their Manufacture and Use" which has been adopted as a text book in many of the forestry schools and universities. Mr. Brown has also written a number of valuable articles for lumber trade journals, and popular and scientific magazines.

Since completing his work with the Government he has been actively engaged in the domestic and foreign lumber trade as a partner in the American Woods Export Association, 30 Church St., New York City and the American Woods Company, being also closely affiliated with the American Lumber Sales Company which took over the contract for the disposal of 135,000,000 feet of the surplus stock of the United States Shipping Board. Mr. Brown returned to Europe in 1919 and spent the winter of 1920 as consulting adviser to the Republic of Czechoslovakia on the management and exploitation of the Hapsburg Crown Forests which recently came into the hands of the new republic. He made

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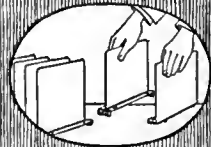
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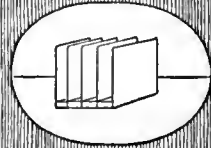
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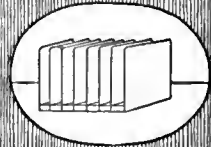
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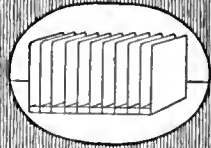
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a personal investigation of the forests throughout Czechoslovakia and studied forestry conditions in Poland, Russia, Austria and Hungary. Mr. Brown is one of the directors of the American Forestry Association.

PLANT TREES FOR BIRDS.

"Among the many considerations that enter into the planting of trees, shrubs and vines about the home, is the idea of growing plants that will attract birds", says Professor Alan F. Arnold of the New York State College of Forestry. "There is a possibility of some species of native birds disappearing altogether, through lack of plants for food and shelter. The list of trees, shrubs and vines attractive to birds includes a great many of our most ornamental plants. There is no more valuable evergreen tree for ornamental purposes, than the native Red Cedar; it also provides the best shelter and nesting sites for birds, while they find food in the berries and insects commonly found on the tree. The native Flowering Dogwood and the Chinese Flowering Crabapple (*Pyrus pulcherrima*) are two of the most beautiful flowering trees and particularly in favor with birds. The Gray-stemmed Dogwood, Monow's Honeysuckle, American Elder and Sheep Berry are most serviceable from both the bird and ornamental viewpoint. The Virginia Creeper, probably the most popular vine, furnishes nesting sites as well as bird food; it is recommended to draw the attention of the birds away from grapes, apples and peaches."

M. B. PRATT HONORED

California's progress along the lines of conservation and the laws enacted by the last session of the Legislature for the promotion of forestry within the State has received a distinct recognition by the election of Deputy State Forester M. B. Pratt as Vice President of the Association of State Foresters of the United States at its annual meeting recently held at Albany, New York.

State Forester Bazley of Massachusetts was elected President and Chapin Jones, State Forester of Virginia, was elected Secretary-Treasurer of the Association.

Mr. Pratt graduated from the Yale Forestry School in 1906 and has been actively engaged in Forestry since that date, most of his work having been done in California. He was Deputy Supervisor of the Tahoe National Forest for a considerable period and from there went to the University of California, where he was Professor of Forestry until his appointment as Deputy State Forester on February 1, 1918.

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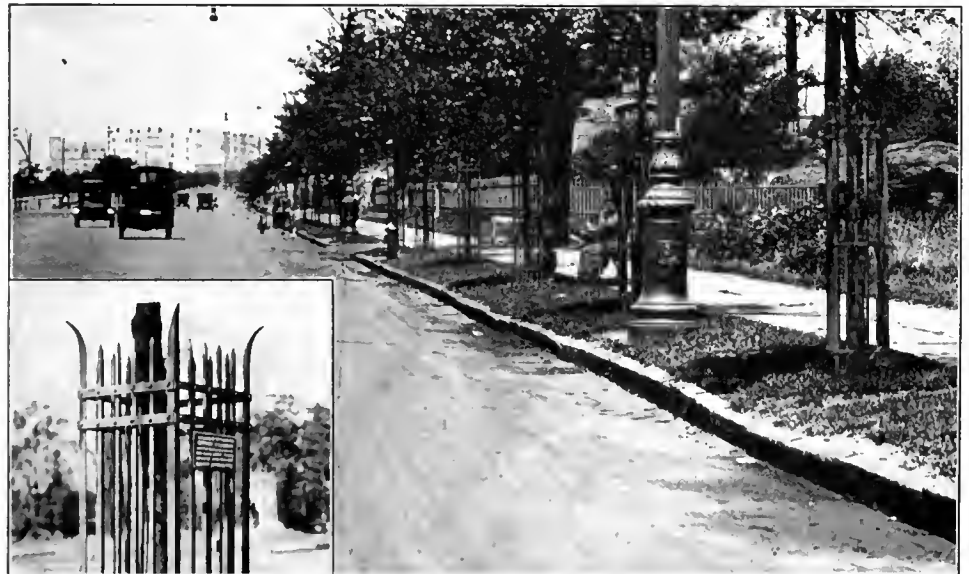
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CITY LANDSCAPE ARCHITECT AND FORESTER, thoroughly conversant with Southern conditions, desires to change. Correspondence invited. Address D, care AMERICAN FORESTRY Magazine, Washington, D. C. (9-11-21)

EX-SERVICE MAN; age 30; married; two and one-half years in forestry college; experienced in city forestry, nursery work, tree surgery, dynamiting and in handling men; wishes position in city forestry or park department any where in northeastern United States. Now employed. Address Box 3025, care AMERICAN FORESTRY MAGAZINE, Washington, D. C. (10-12-21)

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FORESTERS, UNEMPLOYED OR EMPLOYED, having executive ability and possessing the gift to lead others, to write us. Great opportunity for those that qualify. State age.—reference—(2) if employed. School graduated from (years). Confidential. Rangers also answer this. Address Box 66-66, AMERICAN FORESTRY MAGAZINE, Washington, D. C.

CITY FORESTERS—The Oklahoma Forestry Association, in order to assist cities and towns in Oklahoma to procure men with technical training and practical experience in city forestry work desires names of qualified men. Please send name and address, giving age, training and experience to the Secretary, THE OKLAHOMA FORESTRY ASSOCIATION, Stillwater, Oklahoma.

C. W. WATSON JOINS IDAHO STAFF

In line with her policy to render most efficient service by increasing the facilities for instruction in proportion to the demands of an increasingly large enrollment the School of Forestry at the University of Idaho has secured the service of Clarence W. Watson, as a new Instructor in Forestry for the present school year. Mr. Watson received his degree of Bachelor of Philosophy from the Sheffield Scientific School of Yale University in 1916 and after an interruption of two years during the war completed his graduate work at the Yale School of Forestry for the degree of Master of Forestry in 1920. Mr. Watson served 16 months in France with the Engineers, during which time he was engaged primarily on engineering assignments. In 1920 Mr. Watson was awarded a scholarship from the American Scandinavian Scholarship Exchange and he has just returned from a year's study of forestry in Sweden. He will handle the courses in Silviculture and Grazing at the University of Idaho and under his competent leadership this department will be developed and maintained at the highest possible standard.

MONEY FROM FORESTS

Twenty-eight States have received checks totaling \$619,993 from the United States Treasury as their share of the receipts from the National Forests for the fiscal year ending June 30. An additional \$247,997 of the receipts has become available for road and trail construction by the Forest Service of the United States Department of Agriculture within the National Forests of these same States; making a grand total of \$867,990.

The amounts are considerably smaller than for the previous fiscal year, when the total was \$1,652,088. This is due largely to the concession made by Congress to stockmen, whereby they are allowed until December 1 to pay their grazing fees due last spring. This action was made necessary by the widespread depression in the live stock business. A small portion of the reduction is due also to a falling off in timber sale receipts of the forests due to business conditions.

Only States within which National Forests exist share in the receipts. By Act of Congress, 25 per cent of the funds derived from timber sales, grazing fees, special uses, etc., are returned to the States for roads and schools. The amount thus received is redistributed to counties in lieu of taxes, based on the area of National Forest land within their boundaries. In addition, 10 per cent of the forest receipts are spent within the counties by the Forest Service on road and trail construction and maintenance.

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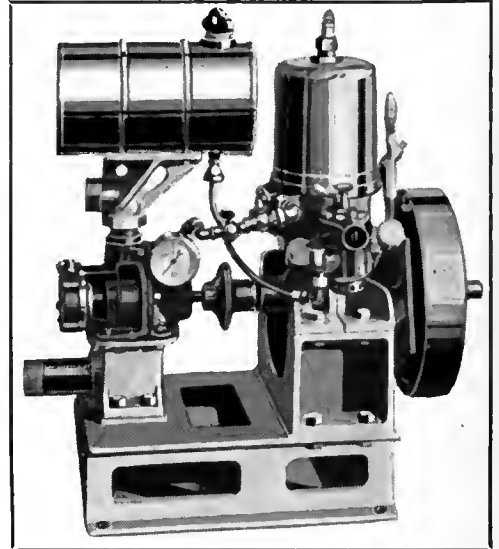
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CHANGE OF ADDRESS

A request for change of address must reach us at least thirty days before the date of the issue with which it is to take effect.
Be sure to give your old address as well as the new one.

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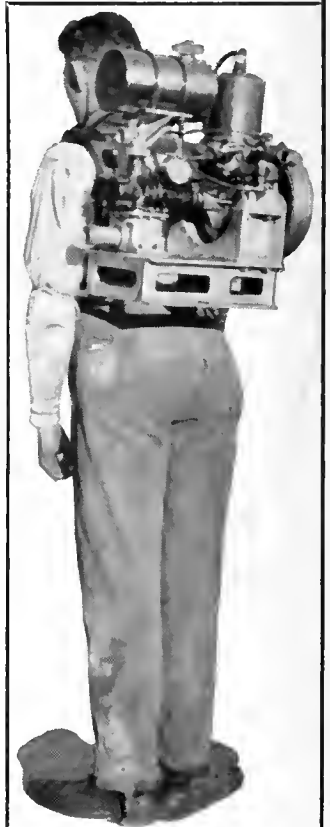
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AMERICAN FORESTRY

VOL. 27

DECEMBER, 1921

NO. 336

WHAT OUR CHRISTMAS TREES ARE

BY J. S. ILLICK

THE forests contribute much to our happiness and welfare. Valuable gifts are flowing forth from them continuously, but at no season of the year are these gifts of greater value or deeper significance than at Christmas time—that season when happiness means giving.

An attempt to name all the good things that our forests give us at Christmas would be difficult, and might be tiresome. It would make a long list, for the products of the forest used annually for decorative and other purposes are many in number and vary widely. There are, however, a number of important Christmas gifts supplied by our forests that are of paramount importance. It will be to our advantage and satisfaction to get acquainted with them, for Christmas would be incomplete and lack much delight and merriment without them.

Christmas trees are the biggest contribution of our forests to our annual Yuletide celebrations. They bring much joy and happiness, but if the people really knew them well their joy and happiness would be multiplied many times. To know trees well is to love them. They are among the most lovable living things on the earth. They do so much good, help us in so many different ways, and yield so many essential things of every day life that they are really among the most indispensable natural objects on the face of the earth.

It is not difficult to get acquainted with our common Christmas trees. Each one of them has a number of outstanding features by which it may be recognized at

all seasons of the year. With a little effort we may bring ourselves in a closer relationship with these green joy bearers, and make our lives fuller and richer.

The principal Christmas trees of the East are the Firs and the Spruces. They comprise at least seventy per cent of all the trees that are used. In some

regions where these two groups of trees are not native or not easily obtainable, such other trees as the Red Cedar, Hemlock, Arbor Vitae, White Cedar and the Pines are used. In fact, every kind of evergreen tree is being used as a Christmas tree, but some of them are more desirable than others. There has grown up a strong preference for the Firs and the Spruces, and wherever they are available at reasonable prices they are being used almost to the exclusion of all other kinds.

Both the Firs and the Spruces are native to the Northwoods. It is there that they grow at their best, and develop their beautiful foliage and attractive form. The beautiful Norway Spruce has its finest growth in Sweden and Norway, where its wood is known as Dantsic deal. The immense forests of Douglas Fir, in the northwest of America, where the trees attain a height of three hundred feet are famed everywhere.

And travelers never tire of

describing the forests of silver fir in the mountains of northern Asia, where a tree less than 300 years old is not often seen. These two well-known groups of trees, the Firs and the Spruces may be distinguished from each other by the following characteristics:



WHAT WOULD CHRISTMAS BE WITHOUT IT?

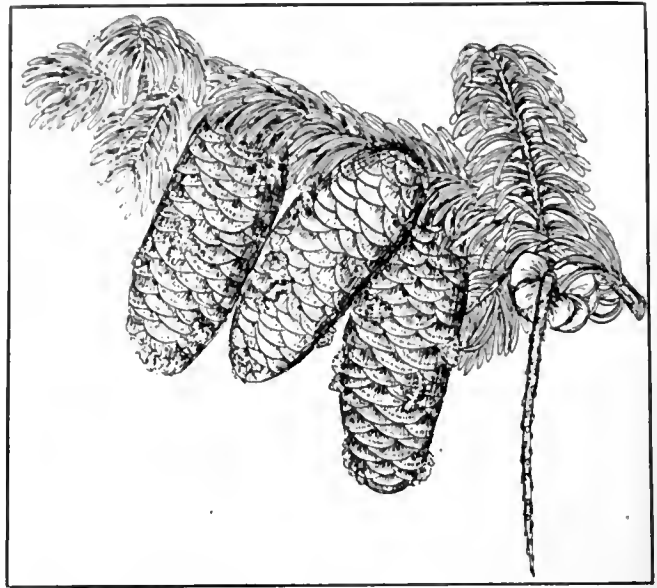
Symbolizing happiness and the great love of the little Christ-Child for man, the Christmas Tree is truly the happiest tree of the year.

FIRS

1. Leaves are needle-like, not stalked, flat, often notched at the apex, dark green above and marked with two white lines on the lower surface.
2. Twigs are smooth.
3. Bark is smooth and dotted with blister-like balsam sacs.
4. Buds are heavily coated with varnish-like resin.
5. Cones are large and erect; cone scales fall from cone axis shortly after they are ripe.
6. Wood is without resin passages.

SPRUCES

1. Leaves are needle-like; short-stalked, 4-angled in most species, green on all sides, blunt to sharp-pointed.
2. Twigs are rough.
3. Bark is scaly.
4. Buds scaly, non-resinous.
5. Cones are small; cone-scales do not fall from cone-axis.
6. Wood contains resin passages.



BALSAM FIR HAS DISTINCTIVE CHARACTERISTICS
Its leaves are flat and blunt-pointed. The cones are cylindrical in outline and the cone-scales fall off soon after they reach maturity, leaving a slender bare cone axis.



THE BEST CHRISTMAS TREE OF ALL
The Balsam Fir is as well among the most attractive forest trees of the North woods.

There are 25 different kinds of Fir trees found in the world. Ten of these are native to North America, eight occur in the Pacific slopes and in the Rocky Mountain regions, and only two are found in the eastern United States, and one of these—Fraser's Fir—is limited to the high mountains of Virginia, North Carolina and Tennessee. The Grand Fir, Noble Fir, White Fir, and Red Fir are the most important of the western members of the Fir group. All of these trees have such a strong resemblance to one another that a description of one of them may suffice for the group. The Balsam Fir is unquestionably the best known and most widely distributed of our native Firs. It is one of the most beautiful evergreen trees native to North America. It frequents bogs, swamps, and other wet places. Among its chief associates are the American Larch, Arbor Vitae, Black Spruce and Red Spruce. Its companion species are not many for few trees can withstand the extreme wet and cold conditions of our northern bogs and swamps.

A mere glance at a Balsam Fir tree is usually sufficient to distinguish it from any other eastern forest tree. No other American evergreen tree is more attractive. Most people who have lived or visited the northwoods, where the Balsam Fir grows naturally, have a distinct and lasting impression of its appearance. It is the prettiest among all our Christmas trees, for it has an attractive form, dense crown, and beautiful foliage, which persists long after other trees have dropped their leaves.

The leaves of the Balsam Fir are distinctive. They are flat, dark green on the upper surface and pale green with two white lines on the lower side. They are without stalks, and consequently, when they fall off, the twigs to which they were attached present a smooth surface. This absence of leaf-stalk accounts for the fact that the

leaves persist much longer after the trees are cut than on many of our other conifers. The leaves appear to be arranged in two horizontal rows, one on each side of the twig, but a close examination of the twigs will show that they originate along a spiral line which extends around the twigs, but assume a two range position in order to get as much light as possible.

There is another characteristic by which the Balsam Fir may be distinguished. A careful examination of the



HOLLY FOR CHRISTMAS

The leaves of the Christmas holly are deep green, stiff, and armed with spines along the margin.

trunk of a tree will reveal a large number of little blister-like sacs of balsam. If one takes a knife and punctures them the balsam will flow forth freely, or if a knife is lacking, one may take the finger nail and push it into the little blisters and there will flow forth immediately a small quantity of balsam, as clear as crystal. This balsam when refined is used in making microscopic slides in our scientific laboratories. It is used chiefly to attach cover glasses to microscopic slides.

In some localities the balsam is collected for medicinal purposes by the inhabitants. It is regarded as an excellent medicine in the treatment of throat and pulmonary troubles. I have observed many mountaineers collecting the balsam from the blisters on the trees and then store it away for family use. Such home-made remedies are prized far more highly, and are actually of greater value, than many city people appreciate, for the people who use them often live many miles from the nearest

physician and consequently must depend upon home-made remedies.

The buds and cones of the Balsam Fir are also very distinctive. The buds are almost round in outline, about one-sixth of an inch long, clustered at the end of the twig and appear to be covered with a coating of varnish. The cones are from two to four inches long, cylindrical in outline, and stand erect on the twigs. Their scales fall off soon after they reach maturity and leave a bare central axis. This is an unusual habit among our ever-green trees.

It is a common practice in the Northwoods to collect large quantities of leaves and use them in filling pillows and cushions, for the leaves when dried emit a very fragrant balsam odor. The wood is soft, does not contain resin passages and ranges in color from white to brown. It weighs about 24 pounds per cubic foot and is used extensively in the manufacture of paper pulp, crates and packing boxes.

The Balsam Fir is a tree which satisfies many human wants, but the greatest of all its gifts is the Christmas tree. As a Christmas tree it has no superior, and in many localities no other native tree has Christmas tree qualities that even approach it. The European Fir, so common throughout many parts of Continental Europe, has

many characteristics in common with our Balsam Fir. It, too, has been used for centuries as a Christmas tree. The similarity between these two trees is very marked, which may have helped develop our high regard for the Balsam Fir and rate it as the foremost Christmas tree of the eastern United States.

There are twenty different kinds of Spruce trees in the World. All of them are beautiful evergreen trees. They



BALSAM FIR BARK

The bark of the Balsam Fir is smooth and of a grayish tint.

occur in every country in the northern hemisphere. Eight of them are native to North America, three being found in the eastern part and five in the western part of the country. The three eastern species are:

1. White Spruce.
2. Black Spruce.
3. Red Spruce.

All three of them are at home in the Northwoods, where they have a very wide distribution, one of them extending from the Atlantic Coast clear across the continent. Our native Spruces have so many characteristics in common with one another that it is not necessary to point out the fine lines



Courtesy Amarwalk Nurseries

NORWAY SPRUCE

Beautifully symmetrical, this species is a great favorite for use as a Christmas tree.

reason why the needles of the Spruce fall off from the twigs so much sooner than do the needles of the Fir. It follows that in selecting a Christmas tree it is recommended to procure a Fir whenever possible, for they have a beautiful foliage and the leaves will remain on the trees much longer than those of most other evergreen trees.

Our forests have been depleted of Christmas trees to such an extent that it is now imperative to take measures to insure a future supply. The first step that is necessary is the proper protection of our forests from forest fires.

The planting of evergreen trees for Christmas purposes is now an estab-

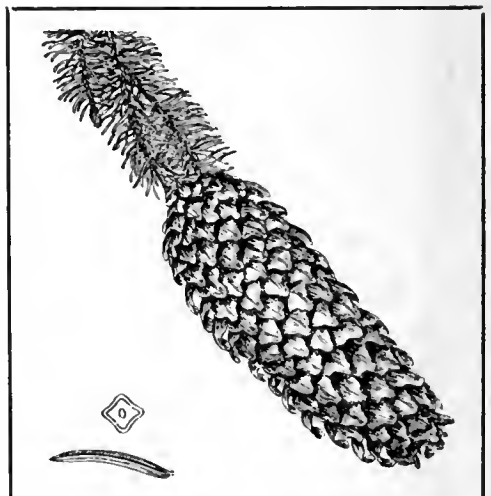
of distinction that exists between them, for the average householder who desires to know the name of the Christmas tree that adorns the home, will be satisfied to know that the tree is a Spruce, or some other kind of tree. One may readily recognize the spruce trees by their needles, which are not flat like the Balsam Fir, but 4-sided. The needles are attached to the trees by means of tiny brown stalks, which are entirely absent in the Balsam Fir. This difference between the Spruces and the Firs is the



Courtesy Amarwalk Nurseries

HEMLOCK

Popular as a Christmas tree in some sections, the chief objection to it is that it does not live long after it is cut; dropping quickly.



IDENTIFYING CHARACTERISTICS OF NORWAY SPRUCE

The Norway Spruce is being planted extensively for Christmas trees. Its cones are about 5 inches long, its leaves are short and 4-sided.

lished and profitable business in some localities. There is a private forest of about 1,500 acres in Pennsylvania upon which 560 acres have been planted to forest trees. Among the planted trees suitable for Christmas tree purposes are Norway Spruce, Douglas Fir, White Fir, White Spruce and a few other evergreen trees. Planting operations did not begin until 1919, but they have continued annually since then. A careful study of the established plantations shows that the trees crowded each other as they increased in height and extended their



A CHRISTMAS TREE FARM

This is located in Berks county, Pennsylvania. The thrifty young trees in the foreground are Norway Spruce.

lateral branches. The Forester in charge found that it was advisable to remove some of the trees for the ultimate good of the plantation and began to inquire if he could market them as Christmas trees. He went to a nearby city and found that he could dispose of some of the trees. In a few years the demand for home-grown Christmas trees became very strong, and now there exists a ready market for his entire output. As a result of this development a net profit of \$3,800 was realized in 1917, \$4,300 in 1918, \$5,350 in 1919, and \$6,200 in 1920. The growing of Christmas trees is now a profitable business on this forest. Numerous plantations have been established for the purpose of raising evergreen trees suitable for decorative purposes at Christmas time. It is reasonable to assume that they will be successful and profitable from a financial point of view, and will help relieve the Christmas tree shortage which is now developing rapidly.

In regions where the Firs and Spruces are not avail-

able, the Red Cedar is often used as a Christmas tree. It has a characteristic conical to pyramidal form and develops a dense and attractive crown. It is frequently found naturally along fences, roads, abandoned fields and open hillsides, where it forms a distinctive but impressive feature of the landscape. When it develops in such open situations it is well adapted for use as a Christmas tree.

Another tree that is sometimes used is the Hemlock. It, too, just as the Spruces, has leaves that are attached to the twigs by tiny little stalks, which cause them to drop off shortly after the trees are cut. Those who live close to the forest and can procure a hemlock tree a day or two before Christmas, will find that it gives satisfaction, for if not kept too long after it is cut, the needles will persist and the tree will serve as a Christmas tree.

Local customs have much to do with the selection of Christmas trees. In some localities the pine trees are well liked and used rather extensively, but they do not have the desirable form or the attractive foliage required of a good Christmas tree. The pines are not difficult to identify for their leaves are put up in the form of long slender needles, and arranged in clusters of two, three, four or five.



Courtesy Amawalk Nurseries

COLORADO BLUE SPRUCE

An ornamental tree, the Colorado Blue is coming into a new use in some sections, being carried into the house in a large tub and used for a Christmas tree.



BLACK SPRUCE BARK

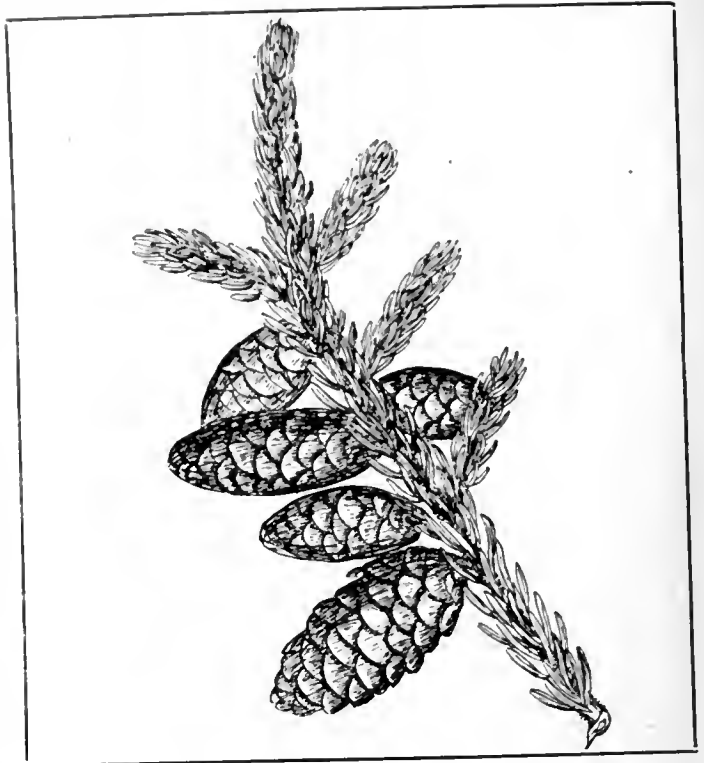
The bark of the Black Spruce is covered with thin grayish brown scales.

The White Pine has its needles in clusters of five, while those of the Pitch Pine occur in threes, and those of the Jack Pine in twos. The western White Pine and the Sugar Pine, like the eastern White Pine, have their needles in clusters of five. The Short-leaf Pine of the South has its leaves in clusters of two or three, while the Long-leaf Pine has its needles in clusters of three, and range in length from 12 to 18 inches. The Long-leaf Pine is rarely used as a Christmas tree, but during the past few years enormous quantities of branchlets of this tree, covered with dense tufts of foliage, have been shipped into the northern markets and sold as "Louisiana Palms", and "Florida Pines." The demand for this material appears to be growing, and it is quite likely that a permanent market may be established, but it is hoped that some method of cutting will be used that will not interfere with the regeneration of the forest or

mutilate the trees from which the branchlets are cut.

Christmas trees are not the only gifts of the forest used for Christmas decoration.

The holly wreath is one of the oldest, best known, and most widely used decorative designs used at the Yuletide season. To really know the holly is to love it. It has held a prominent



NEEDLE-LIKE LEAVES AND CONES OF RED SPRUCE

The three spruce trees native to eastern North America are used extensively for decoration at Christmas time.



RED SPRUCE BARK

The bark is ruddy brown, becoming grayish with age.

place in the legends of old, and is frequently mentioned in history, and prized highly today.

The American Holly, also called Christmas Holly, and the closely related European Holly, are linked inseparably with our Christmas traditions. Many people are familiar with the holly leaves and berries, but few of them know that they grow upon trees which are common in the coastal plain regions of the South and found locally as far north as Pennsylvania and along the Atlantic Coast to southern Maine.

While the Christmas Holly may reach a height of 50 feet and a diameter of 2 to 3 feet in Arkansas and Texas, it rarely exceeds 20 feet in height and a few inches in diameter in the extreme northern part of its natural range.

The northern migration of the Christmas Holly is really an interesting story. This tree is a native of the southland, reaching its greatest abundance in the coastal plain regions, its largest size in Texas, and great-

est beauty along the foothills of the Carolinas. For centuries it has been pushing northward. Progress was made slowly. Each forward step meant the sacrifice of many individual trees that were not hardy enough to withstand the cold winters of the North. It, however, advanced step by step, and with each forward stride became harder and better fitted to struggle for an existence. After many years of struggle it became firmly established in the southern and southeastern part of Pennsylvania, especially along the banks of the lower Susquehanna River. In time it became fairly abundant in this region, and after a few generations of trees had grown up in this region, they produced a young race of baby trees which were quite frost hardy. These in turn produced frost-hardy seeds, which by chance were carried by birds or some other agent and dropped upon favorable sites still farther northward. These seeds in turn developed into small trees which in time produced seed with even more frost-hardy characteristics. Thus,



Courtesy Amawalk Nurseries

THE AUSTRIAN PINE

One of the most beautiful of the ornamental evergreens and sometimes used as a Christmas tree.

is the history of the Christmas Holly trees that now stand in Dauphin County in central Pennsylvania, which for many years were regarded as the most northern known station of this tree in Pennsylvania. On December 12, 1921, a new station of the Christmas holly was outpost is along Chatham's Run, Clinton County, at an altitude of about 600 feet above sea level. Here occurs found fully a hundred miles farther northward. This

only one solitary specimen. It is the most northern inland station that is now known.

The Christmas Holly can readily be recognized at all seasons of the year by its deep green leaves which are armed with spines along the margin. The leaves are so bright that they often reflect light as mirrors. The small bright red berries are also a helpful means of identifica-



A NEWCOMER FROM OUT OF THE WEST

The Douglas Fir, native to the forests of the Pacific Coast and Rocky Mountain regions, is now being grown in Pennsylvania as an ornamental and Christmas tree.

tion in fall and in winter. An old manuscript in the British Museum states that the "Holy hath berys as red as any rose." This has led to the belief that early writers called it the "Holy Tree." Devout people regard the leaves of the Holly as a symbol of the Saviour's crown of thorns.

Unquestionably, the holly wreath is attractive and popular, but unfortunately the methods of collecting the branches is very destructive. In many instances the tops of the trees are cut out completely, leaving nothing but an erect bare trunk. We need the holly sprig for decorative purposes at Christmas, but in order that a future supply may be insured, special steps must be taken at once to regulate the cutting in such a way that all the existing trees may continue to produce annually an abundant supply of thrifty branchlets.

Another Christmas gift of the forest is the Mistletoe. It is the only parasitic plant that is used for adornment at Christmas time. It is sometimes called a tree thief,



A SOUTHERN CHRISTMAS TREE

The Red Cedar is used extensively in the Southern and Central States as a Christmas tree.

for it gets all its nourishment from the trees upon which it lives. Traveling throughout the South one may see thousands of trees literally festooned with the Mistletoe. It sometimes grows in the form of a witches' brooms, or one may see it dangling down from the branches of a tree in graceful array. A careful study of the life habits of this unique plant will reveal the fact that it always appropriates for its own development the life blood of the tree upon which it feeds.

There are more than four hundred species of Mistletoe known in the world. Most of them occur in the tropics, and nearly all of them are parasitic. Many varieties are found in the United States. They occur from the coast of New Jersey southward and westward.

The Mistletoe is so common in the State of Oklahoma that it has been selected as the State flower. If you question an Oklahoman about this parasitic plant as a State flower, he is likely to answer that if man may

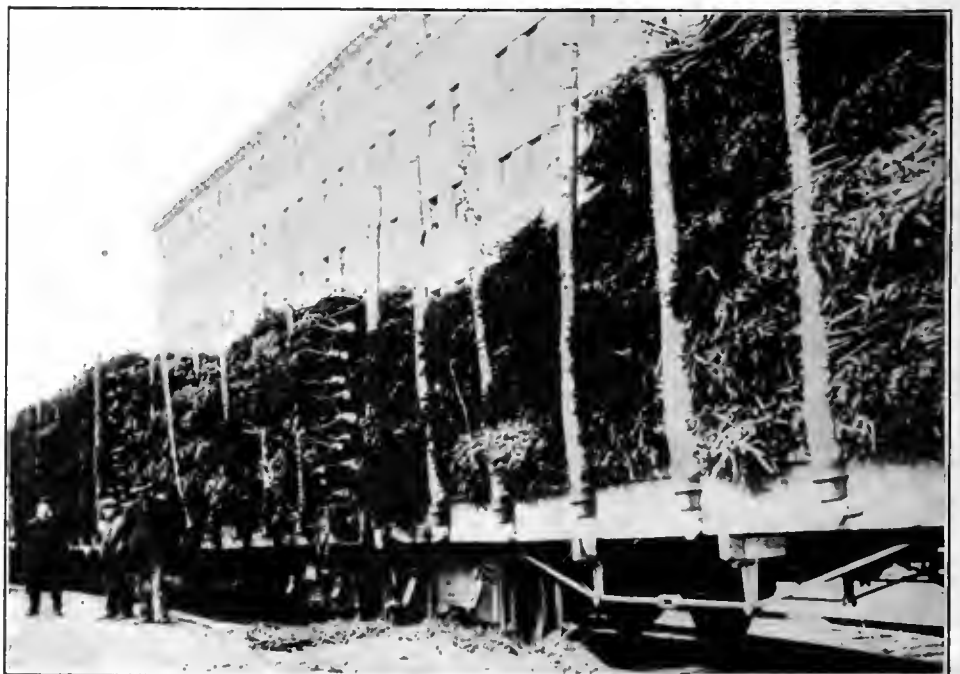
tap the Maple tree for sugar, and the Pine tree for turpentine, it is fair for the Mistletoe to tap trees so that it may develop and become available for decorative use.

The Mistletoe is not only unique in its appearance, and in its flowering habits, but also because of its structure. A careful examination of the leaves of the Mistletoe will reveal that they are almost nerveless, thick and fleshy, and if one has a magnifying glass and examines the lower surface of the leaves he will find only about 200 breathing pores to the square inch, while in the common Lilac there occur at least 200,000 breathing pores to the square inch.

The white fruit of the Mistletoe is attractive and unique in its make-up. The seed is covered with a gelatinous covering which adheres very readily to the feet of birds, and is thus carried to the twigs and branches of trees upon which it germinates and begins to grow. When the seed puts out roots they always turn towards the branch, no matter whether they are located on the upper or lower side, and experiments conducted by the writer show that the new sprouts will even turn towards glass.

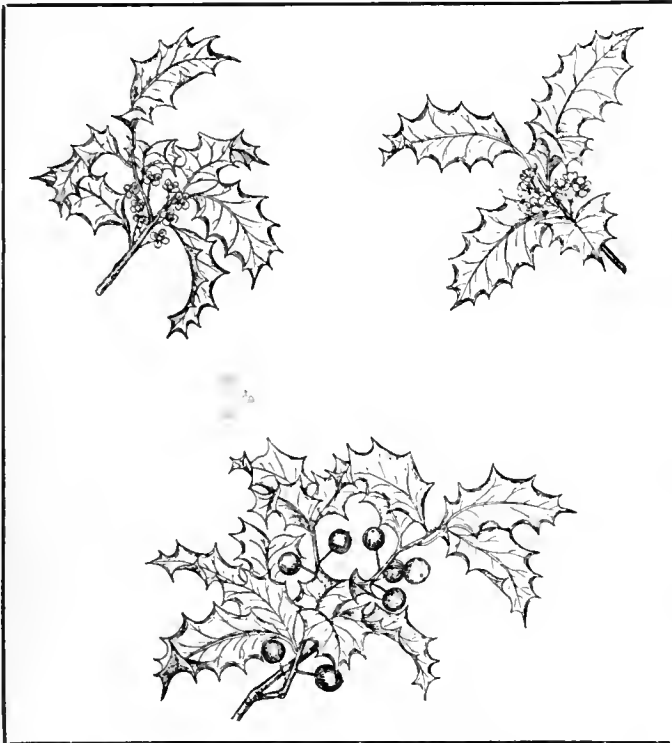
Few people may know that it is possible to propagate the Mistletoe. The writer has planted the seed collected in our market places at Christmas time upon the branches of trees, and observed that they germinated and developed into tiny and thrifty little plants. In planting seeds of the Mistletoe it is important to know the trees upon which it prefers to grow for it will not develop upon all kinds of trees. Some of the trees upon which it prefers to grow are the Elms and the Hackberries. Both of these groups are close kin of the Mistletoe. Locally it is also abundant upon Sycamore and Gum trees.

Large quantities of Trailing Pine, also known as Princess Pine, and Ground Hemlock are used at Christmas time. These plants really are not pines or hemlocks, but are closely related to the ferns. They belong to the group of plants which are technically known as Lycopodium. A number of different species are common in open situations in our forests and are gathered in enormous quantities for decorative purposes at Christmas time. They belong to an ancient race of plants, so ancient that only a few remnants of them are left, and they have now degenerated to mere trailing



ON THEIR WAY TO CELEBRATE CHRISTMAS

Thousands of evergreens are shipped yearly for use as Christmas trees and Yuletide decorations, and this is a typical carload.



BOTANICAL STUDIES OF THE HOLLY

The American Holly is linked inseparably with our Christmas traditions. The pollen-bearing and seed-producing flowers usually occur on different trees.

plants, while in ancient times they were the prevailing type of vegetation found in many places upon the face of the earth, and among their members were many stately trees.

When we consider the many gifts with which our forests supply us at Christmas time, we cannot help but realize that Nature is liberal with us. When our country was still new and undeveloped, decorative material for Christmas use was super-abundant, but as the population increased the demand for it increased proportionately, and in time the supply began to dwindle. Now the demand is so great and the supply so small that something must be done to insure a future supply. Many suggestions may be made to meet the situation, but there are only two practical solutions to this great problem. It is imperative that the existing supply must be given adequate protection and harvested with care. This means that our forests must be given adequate protection in order that there may continue to flow forth from them a continuous flow of necessary Christmas gifts, which means that the great curse of our forests—forest fires—must be stopped. There is no better way to insure a future supply of Fir and Spruce trees, Holly wreaths and Mistletoe than by making our forests fire-proof.

Then, too, we have reached the point of our economic development when it would be almost criminal for us to depend entirely upon nature's gifts. It is our duty to help nature, and wherever possible to improve upon her way

of doing things. We may do this by actually growing much of the decorative material required for Christmas time. We can grow Christmas trees from seeds, and we can propagate the Holly and the Mistletoe. It is an established fact that Christmas trees may now be grown at a profit. It is not a mere pastime for the rich, but a paying business.

Just as Christmas trees are now being raised at a profit, so it is also possible to raise the Christmas Holly and the Mistletoe by artificial means. In this way an



Courtesy Forest Pathology, Department of Agriculture.

THE FAR-FAMED MISTLETOE

The only parasitic plant that is used for adornment at Christmas time, and truly a "tree thief" because it gets its nourishment entirely from the tree upon which it lives.

adequate supply may be insured for the future, and all those who will contribute towards the development of successful methods of propagating these plants will insure the welfare and happiness of future generations and bring innumerable blessings to unseen faces.

THE CUTTING OF CHRISTMAS TREES

BY ALFRED GASKILL

STATE FORESTER OF NEW JERSEY

IT may be admitted that the practice of wasteful cutting in producing Christmas trees is as objectionable as wasteful cutting by lumbermen. It is a fact, however, that the production of Christmas trees is a perfectly legitimate industry which can be practiced in complete accord with the accepted method in forestry. In fact, it is entirely possible to produce Christmas trees upon ground that is devoted to the production of timber, or pulp wood.

The hills of Vermont are counted on to produce each year some 5,000,000 trees for decorative purposes. That means that approximately 5,000 acres of rough Vermont land are to yield a paying crop in the form of Christmas trees. It may be doubted if any other crop that could be taken from such land would be so remunerative. From the standpoint of economics therefore the industry is justifiable, and if it be pointed out that Vermont has 2,500,000 acres of such land, which the owners would do well to utilize, as they do not now do for the production of Christmas trees and lumber, they and their State would benefit largely.

If forestry is to establish itself it must be upon a practical basis. Foresters everywhere are striving for a rec-

ognition of this rule. They do not exclude from the list of forest products anything which benefits humanity, and enlists the owner's interest by being profitable to him.

We have several forest states. Part of their wealth has been derived, and probably always must be derived, from forests. The extraction every year of several million Christmas trees will do good rather than harm, provided the industry is established on a rational basis.

Surely the introduction of forest greens into winter homes and wintry surroundings is gladdening, uplifting, mellowing, and tends to loving kindness, as well as jollity. Barring occasional accidents, I feel strongly that any effort to rob the Christmas spirit of its woodland quality would be most unfortunate.

Even if it were necessary to sacrifice something of our forests to support this idea it would be worth while, but no sacrifice is necessary. We can have Christmas trees in abundance and more and better forests through a stimulation of Christmas tree production rather than through an effort to curtail it.

AN AGE-OLD CUSTOM

VERY commonly the question is raised as to whether the cutting and use of trees for Christmas purposes is not a great waste, and whether steps should not be taken to discourage or prohibit it. In the opinion of forestry officials the custom is so old, so well grounded, and so venerated, that even if it were economically somewhat indefensible, these aspects will and should continue to outweigh economic considerations. It is denied, however, that pure economic considerations would lead to the abandonment of the Christmas-tree custom. Trees are for use, they argue, and there is no other use to which they could be put that

would contribute so much to the joy of mankind as their use by children on this one great holiday of the year. Further, particularly in the Northeastern States, a large proportion of the Christmas trees are cut from pasture lands on which they are encroaching or from land which would be cleared up in the ordinary course of farm improvement. The trees would be cut in any event. A market for them gives the owners some return for their labor if nothing more. It is true that in the vicinity of



CHRISTMAS TREES—REAL ONES, IN FESTIVE ARRAY

large cities, the Christmas-tree supply is sometimes secured in such a way as to be destructive of young growth and this, of course, should always be discouraged.

That the use of Christmas trees is perfectly compatible, however, with the welfare of the forest is fully proved by the practice in the European forests. The cutting of small trees for Christmas is not there considered in the least as a menace to the forest but as a means for improving the forest and a source of revenue, and is therefore constantly encouraged. It is not by denying ourselves the wholesome pleasure of having a bit of nature in our homes, forest officials say, that we shall preserve our forests, but by learning how to use them wisely and properly. The following rules are laid down by the United States Forest Service for the woodland owner who wishes to improve a rather dense stand of evergreens and market the good trees for Christmas purposes:

- (1) Find a market for Christmas trees of the species which are growing on your land.
- (2) Go through the woodland carefully, pick out and mark the most vigorous specimens of trees. These should be allowed to remain to form the mature stand of timber.
- (3) Mark for removal the trees which are crowding these better specimens.
- (4) Cut as many of these inferior trees as there is a suitable market for. Cut them carefully to avoid damage to the remaining trees.
- (5) Remove them carefully from the area and market them in accordance with instructions from the buyer to avoid any cause for dispute.

THE CHRISTMAS TREE

By Alexander Blair Thaw

Wandering tribes now roam
 The hills of Lebanon,
 Knowing not house nor home;
 Gone the great cedars, gone
 That temple built of them
 Once, in Jerusalem.

Once, through the groves of Greece,
 Down from the Delphic slope,
 Rang their great songs of peace,
 Filled with a burning hope,
 Bearing strange prophecy
 Of mortal liberty.

Once our forefathers heard,
 Under the sacred oak,
 Some strangely muttered word,
 Whispered by tongues that spoke
 Forth from the Druid tree,
 Darkly, of things to be.

Though to our senseless ears
 The leaves no longer sing,
 Yet, through the lapse of years,
 A still small voice doth bring
 Peace upon earth again,
 And freedom to all men.

Set on a little hill,
 Over a world that grieves,
 One living tree shall still
 Scatter its healing leaves,
 Gathered for our distress
 Out of the wilderness.

Out of the desert wild
 Comes, with a heavenly voice,
 News of a new-born child,
 Bidding the world rejoice,
 Bringing all those who roam
 Back to each earthly home.

Now all the fruitful earth
 With heaven is reconciled,
 Since, on each sacred hearth,
 And in her forests wild
 Under the open skies,
 Songs of pure love arise.

Tree Stories For Children

The First Christmas Tree

By Mary Isabel Curtis

TO almost every boy and girl at holiday time a tree means a Christmas tree. But how much, I wonder, do you children really know about this most beautiful tree of all?

Many, many years ago when Joseph of Arimathea came from Palestine to England to tell the English people all about the life and death of Christ, there had never been a Christmas tree in any country in the world. Very few people lived in England at that time and those who did live there were wild, rough men and women who did not welcome strangers to their land.

Joseph and his friends were glad enough when they reached England after a long and stormy voyage on the ocean—for in those days there were no comfortable, big ships such as we now travel on. They had come all the way from Palestine in a little open boat exposed to bitter, winter weather, and were cold and tired and weary of the sea.

After they landed they started to travel back into the interior of the country hoping to find some kindly shelter. But no one would receive them. On Christmas-eve their food was gone; they were exhausted and almost perishing with cold when they came to a little hill, that ever since that day has been called "Weary-all." There Joseph, in deep discouragement, dropped down on a rock to rest.

"I have strength to go no farther, my courage has departed and my hope is as dead as this staff in my hands," he declared.

As he spoke Joseph thrust his staff into the ground. Suddenly, to the amazement of them all, the dead wood began to grow. It put forth branches covered with green leaves, and then before their wondering eyes broke into fragrant blossoms. The dry stick of wood had changed into a noble hawthorn tree.

"It is a miracle!" they cried, and all dropped on their knees.

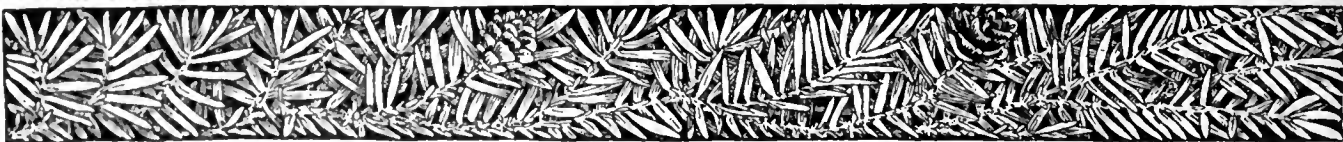
Then one of them recalled a tale that he had heard of how the trees in Paradise had blossomed on the night the Lord was born.

"It is a sign from God," said Joseph, "that He will protect us. Let us end our wanderings and settle in this place."

Strength came back to their limbs and courage to their hearts, so that they were able to construct a few rough houses out of mud and branches. And beside the miraculous thorn tree they built a little church, which later on was added to, and became the famous Glastonbury Abbey.

For many years the sacred thorn tree blossomed every Christmas-eve, and the fame of the repeated miracle spread over all the land. Even today, if you should go to England, you can go to Glastonbury and some one will show you where the thorn tree grew.

The Christmas trees we have and this first Christmas tree all blossom for the same reason; only instead of living flowers, the Christmas trees today blossom out with lights and shining ornaments and glistening stars put there by loving hands because the baby Christ was born.



ENGLAND'S NEW FOREST POLICY

BY ARTHUR NEWTON PACK

(With photographs by the author.)

This is the first of a series of articles on forestry conditions in Europe, written by Mr. Pack when, as Commissioner for the American Forestry Association, he spent three months in Europe examining forestry conditions and interviewing forestry experts in Great Britain, France, Germany and Belgium.—Editor.

ENGLAND has commenced in the last two years what France first undertook two or three centuries ago; what the German states began at almost the same time, and Denmark a little later; what Sweden and Norway faced twenty-five to fifty years ago, and what Canada and the United States must face today. Although, in the centuries succeeding its inception, the forest policy of the

taken bodily from any one nation can apply in toto to another. Even Great Britain found that the same rules could not be applied to every district, but she has formulated, adopted, and put into effect a forest policy, and the results show that the organization and method she has worked out is at least fundamentally sound.

It seems strange, perhaps, that England could so long have avoided the issue, but the circumstances of British colonization in the New World and the facilities for lumber import engendered by her control of the seas, were undoubtedly responsible. Periodically, to be sure, the government took some interest in growing trees, especially in the days of wooden ships, but when steel tonnage drove the old wooden vessels from the seas that interest again flagged, and England found herself at the beginning of the war an importer of 90 per cent of the timber she consumed.

No event in history has contributed such emphasis to utilization of natural resources as the war with Germany, and in 1916 and 1917, faced with the necessity of allocat-



THE FIRST STEP IN AFFORESTATION

Many thousand spruce seedlings from seed sown last spring under the direction of the Forestry Commission in southern England, the need for regrowth being fully recognized.

continental European nations has become such a part of their daily life that they are prone to forget it ever had a beginning, we must not forget that, almost without exception, they took up forestry only when the almost complete exhaustion of their forest resources showed that their very existence depended upon them. The United States is in urgent need of a forest policy and there are bills now before Congress providing one. Only if we are progressive enough to profit by the lesson of Europe and adopt a forest policy now, can we avoid a similar calamity. (Thus far Sweden has been the only nation to act before her keenest suffering began.) No plan



REFORESTING THE WAR CUTTINGS

This plantation of Scotch pine in the New Forest is typical of the work of the Forestry Commission in replanting the cut-over areas. Thriving young plantations are seen everywhere.

ing her ships to the importation of food, Great Britain awoke to find her forest resources far below their possible extent or productive capacity. To supply the pit



GROWING MINE PROPS FOR THE FUTURE

Almost at the back door of the famous Welsh coal mines these men are preparing the ground for a plantation of Douglas fir, which, because of its very rapid growth, will supply pit-props from the required thinnings in a minimum period of time.

props for her mines and help take care of other war and home needs one-half of all the productive woodlands of the United Kingdom fell before the ax.



A GLIMPSE OF LOCH NESS

In the foreground may be observed a small plantation of Douglas fir made during the war. This is a portion of one of the many private estates the acquisition of which by the British Forestry Commission has been made possible through the financial break-up of many of the old landed families.



THE FORESTER'S FRIEND

Small scattered sawmills such as this one among the mountains of northern Scotland render the creation of new forests commercially practical by supplying a nearby market for the timber.

When peace came and shipping was released, England might have gone on as before, but the treaty of peace showed only too clearly that not only were future wars possible, but that certain international hatreds were receiving freer play. The British military authorities were among the first to urge the reforestation of the woodlands cut during the war, and the investigation committee which was the outgrowth of their efforts brought forward a still more astounding fact. The United States and Canada, said the report, were rapidly advancing toward a degree of destructive deforestation which would eventually remove them from consideration as large timber exporting



INCREASING THE FOREST YIELD

Converting an old hardwood forest in Gloucestershire to rapid growing conifers. Note how even the branches of the old trees are sawed and piled for fuel wood.

countries. High lumber prices in Sweden and Norway had only served to emphasize to those nations the importance of conserving their timber supply by a restriction upon the output. France and even Germany could not quite supply their own needs and that nation which did not conserve and build up its own natural resources would be the first to suffer.

So much was the British Parliament taken aback by the findings of this committee that it passed almost immediately a bill embodying its recommendations. Fundamentally, the law which created the British Forest Commission is simply a recognition of the government's cardinal duty of assuming the largest share of the burdens of reforestation. It recognizes, however, that the government could not and should not attempt a forest monopoly, and provides for assistance to private owners, not only in the form of advances for carrying on planting, but also through the reclassification of potential woodlands for tax purposes. It specifically stipulates that any private owner who will adopt proper methods of forest growth and conservation may receive a tax rebate until such time as his forest shall come into practical commercial production, and the tax is then to be based, not upon the capital value of such land or forest, but upon the actual income derived therefrom.

Under the efficient leadership of General Lord Lovat, who in the capacity of Commander-in-Chief of all British Forest troops during the war, had become fully

alive to the situation, and supported by appropriations from Parliament, based upon a ten-year budget system, the British Forest Commission began to function almost immediately after the passage of the act. Because of its singular position as an individual body responsible only to the Ministry and Parliament which created it, operations have been exceptionally free from internal disputes and the delays of governmental red tape. Hundreds of new nurseries have sprung up in England, Wales, Scotland and Ireland, and under an arrangement with the Crown forest authorities who originally controlled the great forest parks of Windsor, New Forest and similar

districts the already established nurseries of the whole country have been drawn upon for more than sixteen million seedlings. Nearly every section of the United Kingdom now displays many acres of healthy tree plantations. Under Parliamentary instruction the committee does not stop with the replanting of the forests cut during the war, but has made a scientific study of the utilization of those miles of waste lands along the sea and amid the Scottish heath which have hitherto been almost entirely unproductive. The downs and moors of England have always played a large part in the poetry and romance of the nation, and it is significant that now, for the first time, they will figure in its economic reconstruction. Forest lovers will appreciate that this utilization of a portion



ALONG THE ROUTE OF THE CALEDONIAN CANAL

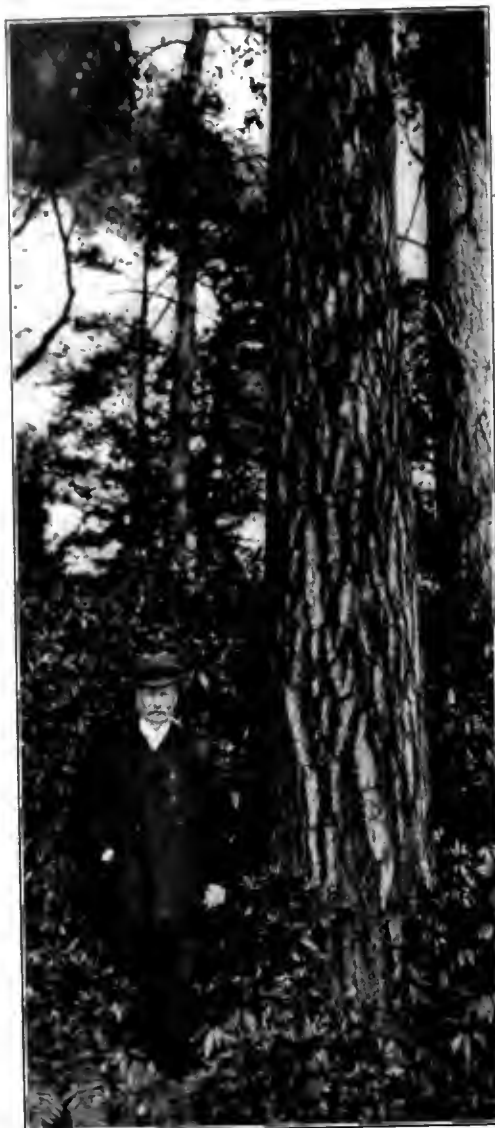
This famous waterway is well known to us through its use during the war as a short cut for American submarine chasers. The bare and hitherto unproductive hillsides are being converted into forests of pine, spruce and fir.

of the heath lands will not in any way destroy their old beauty and charm.

We think of England's great commercial tree as the oak, not only because of the spirit which it typifies, but also because of the great skill of the English lumberman and wood worker in adapting it to the requirements of the home; and more than any other nation in Europe England is a country of homes. Oak, however, is a slow grower, and in the Scotch pine, which is a member of the European common pine family, European larch, and spruce, lies a more readily realizable value. This does not mean that England's great oak forests will not be reconstructed and amplified, but that the conifers are more suited to the poorer soil and produce common lumber for all more general purposes. England's greatest natural resource is of course her coal. It has for years been the one natural product which she exported, as it were, in exchange for the food, cotton and lumber which she needed. The method of mining coal in England and Wales is by means of countless temporary tunnels which require to be shored up with poles. The commercial pit prop of England is a pole less than four inches in diameter at the small end and varying from five feet in length upwards.

A pine tree will last as long as the tunnel is needed and as pine is more rapid of growth it is much less expensive than hardwoods.

Another valuable tree in England is the American Douglas Fir, which in any but a very sandy soil, combined with the natural moistness of the



ENGLAND'S PREMIER COMMERCIAL TREE

A fine mature specimen of Scotch Pine in the old Crown Forest of Windsor.



THE SITE OF A NEW FOREST

Unproductive waste land near the East Coast of England which has been sown with French Maritime pine.

British climate, grows with such rapidity and strength as to almost outdistance its equally aged brothers and sisters of our Pacific Coast. In southern England as well as in Scotland young Douglas Fir seedlings are greatly in demand to replace some of the old, overworked, hardwood forests where the growth has become comparatively unappreciable. Where there are no forests to begin with, artificial planting of nursery grown seedlings is most generally employed, although recent experiments have been made with direct seeding, more particularly with that peculiar species of sand-loving pine known as the Maritime Pine of France. One may see today along the downs of eastern England near Ipswich, great stretches of heath dotted with tiny Maritime Pines sown there with little care and fairly glorying in an almost moistureless soil.

Judging only from efficiency of operation and practical results, the success of Britain's new forest policy should be definitely assured, but unfortunately the criterion of accomplishment alone does not today afford the basis of real success or failure. Particularly amid the present world-wide demand for re-trenchment in all government as well as private expenditures, only a widespread and continued public appreciation of that success and

the benefits to be derived therefrom can guarantee the continuance of the essential appropriations or subscriptions. That the British public is generally ignorant of the splendid work that is being done for them by their Commission is a serious misfortune, and

TREE PLANTING OPENS ARMISTICE WEEK

WITH a simple ceremony the American Forestry Association marked the opening of Armistice Week by the planting of two American Elms at the head of what is to be International Avenue on the grounds of the Lincoln Memorial in Washington. The trees were planted on Monday morning, November 7. Mrs. Warren G. Harding placed the first earth about the roots of the tree for the Allied Armies. The other tree is for the Allied Navies. Charles Lathrop Pack, the president of the Association, made a short dedication speech. Lieut. Col. C. O. Sherrill, in charge of public buildings and grounds as well as aide to the president; Captain Holmes, naval aide to the president, and Miss Laura Harlan, Mrs. Harding's secretary, were present.

There was an invocation by Col. John T. Axton, chief of chaplains of the United States Army, after which Mr. Pack made a short address. He was followed by Capt. John B. Frazier, of the United States Navy, who pronounced the benediction. Col. Axton asked a blessing on the American Forestry Association because of the

work it is doing and touched upon the inspiration for brotherhood in Col. Sherrill's idea for an International Avenue of memorial trees to be planted by the world governments at the limitation of arms conference. The chaplain prayed "that the job that had long lain on God's Work Table for man to do must now be done."

In dedicating the trees, Mr. Pack said:

"Next Friday there will be convened at the call of President Harding a conference of world wide import. Representatives of the governments of the world will take up the question of limitation of armament following the close of the most terrible war history has recorded. On that day the unknown dead will be honored. We come here this morning to mark the opening of Armistice Week by planting living memorials as a sign of our faith that the idea behind the call of our President will live. These Armistice Elms are to stand at what will be the head of the International Avenue of trees to be planted by these world governments.

"The Elm is inseparably connected with the past and



THE ARMISTICE DAY TREE PLANTING

Mrs. Warren G. Harding planting the trees at the entrance to International Avenue approaching the Lincoln Memorial at Washington, D. C., and President Charles Lathrop Pack, of the American Forestry Association, presenting the trees and reading the dedication address.

present of America. With Elms, the earliest forefathers sheltered their cabins. Under an Elm, George Washington assumed command of the Continental Army. On the side of sentiment, the Elm has filled the eye and heart of countless children, men and women in America. Truly the native American Elm is a native born American citizen.

"With its erect pose, it stands always at soldier-like 'attention.' Consequently, it is a fitting monument to the cause of so arranging world affairs that the sons of you men of the American Legion may be spared the hell which you yourselves so bravely and so nobly entered.

"The cause is an appeal to sanity. It is an appeal to save your sons, for if the world again should go mad, your sons, true to their inheritance, faithful to their duty will step into the flaming path which you yourselves have trod.

"For such an avenue this is a fitting spot—the memorial to Abraham Lincoln. Look about you and see him. He and the United States are identical. He and you

men who fought are identical. He and the cause of the plain people for which you fought are identical. He, Eternal Truth, and the cause we mark today are all identical.

"Accordingly in this city where he died and here before his formal memorial we dedicate these trees, native American Elms, dedicate them to the cause of world brotherhood and eternal peace. Therefore, as a representative of the American Forestry Association and in its behalf, I request the American Legion to place these living memorials."

After Mrs. Harding, Mr. Pack and members of the American Legion Posts in the District of Columbia had placed the earth about the trees a bugler sounded "Taps." Immediately after the ceremony Mrs. Harding's trowel and the trowel used by Mrs. Medill McCormick at the tree planting on the Association's grounds last Spring, were sent to the Chicago Tribune for use in Chicago on Armistice Day, when the American Legion planted several miles of a Road of Remembrance.



GENERAL PERSHING PLANTING A TREE IN HONOR OF THE FRENCH DEAD
An American oak planted on October 19, 1921, in the Trocadero Gardens in Paris by the commander in chief of the American
Army, will stand for America's

EDITORIAL

THE SUPPLY OF PULPWOOD

OUR neighbors to the north have quite a sizeable woodpile left according to recent estimates of the Canadian Commission of Conservation; yet the talk of a shortage goes merrily on. Nothing is inexhaustible which is not continually renewed at least as fast as it is used, so some day there must come an end to the virgin pulpwood timber as there has to Michigan white pine. But if the figures are correct our newspapers need not be printed on fibre from grass or bamboos or carved on stone tablets for some time to come.

The Conservation Commission's estimate of actually available pulpwood in the eastern provinces is 306,000,000 cords, while accessible and inaccessible is placed at 501,000,000 cords. In the whole Dominion the most recent estimate is 901,000,000 cords. The divisor for this is five million cords, representing annual consumption, including the 35 per cent exported to the States. This gives a sixty years' supply of available wood for the East and one hundred and eighty years for all Canada if all is ultimately used. Even allowing for increased consumption and fire loss, and assuming that our Canadian friends will continue to share the product of crown (freehold) lands with us, there is enough to maintain a healthy balance of trade and feed their own paper machines for probably half a century.

In the meantime, what? Will effective forestry be established by then and the fire menace curbed, or will the supply be ruined and burned and come to an end? As for the United States, will the Underwood Commission have functioned futilely and its report filed and forgotten, or will be getting wood from the licensed provincial limits from which export is now prohibited? Perhaps the reverse will happen and an embargo or export duty placed on the raw material from Crown lands, as is so ardently desired by a few Canadians. If this happens our own fast growing resources of southern pine, particularly loblolly, may come into their own more promptly and processes perfected for the conversion and bleaching of yellow pulp. Should this happen, Canada might find herself with an over abundance of pulpwood timber wealth. In 1920 we paid Canada the neat little sum of \$191,000,000 for pulp, pulpwood and paper.

All agree that a timber census is essential for the formulating of wise plans and policies, but unless the knowl-

edge is more complete and detailed than any yet at hand, many inconsistencies and uncertain or variable factors remain. In considering the supply of standing pulpwood timber the arch forest enemies of fire and insects must be reckoned with. Neither is under control. On one large tract in Quebec fire in May and June this year killed the timber on over forty per cent of the area, and its damage and extent was greatly increased by the dead balsam killed previously by the bud worm. In the remote north country most fires are caused by lightning, and if thirty mile belts have been fire swept in the past they are likely to be in the future despite all human precautions.

If figures do not lie, Canada has pulpwood for several generations, so why worry? The general opinion is, however, that somebody should worry and that dividing the apparent supply by the consumption does not give the right result. It is said that there is not a well timbered and otherwise desirable pulpwood tract of large size available for purchase on or directly tributary to the St. Lawrence River. If true, it means that a large part of the available one hundred and fifty-five million cords in Quebec is held by strong owners as a long time supply for their own mills, and that the new field, whether Government limits or private, is back in the region of long drives and low stand per acre. And the same statistics show that only eighteen per cent in Ontario and fourteen per cent in Quebec is privately owned, which means that most of this great pulpwood domain has not been considered good enough or accessible enough to be taken over by private owners. Accessibility and ownership, therefore, become potent factors.

Despite the interesting estimates of the Conservation Commission, we come back to the glittering generality that Canada has an enormous forest wealth in spruce and balsam pulpwood; that she is quite cognizant of its value, both for her own industries and for export; and that the United States may get more or less of it according to the political and economic developments of the future. A few Canadians want to keep all of it, the majority are inclined to the status quo or to reciprocal arrangements for the development of trade. All would like to encourage protective measures and forestry practice which will ultimately perpetuate the supply.

ELECTION OF OFFICERS FOR 1922

Inasmuch as a number of changes in the by-laws of the AMERICAN FORESTRY ASSOCIATION have been proposed by a joint committee of officers of the Association and of foresters, it has been decided to postpone the election of officers for the year 1922 until a special election date after the annual meeting in January, 1922. This will enable the Association to elect officers under the provisions of the by-laws as amended at the annual meeting in January. The proposed revision of the by-laws will be published in the January, 1922, issue of American Forestry.

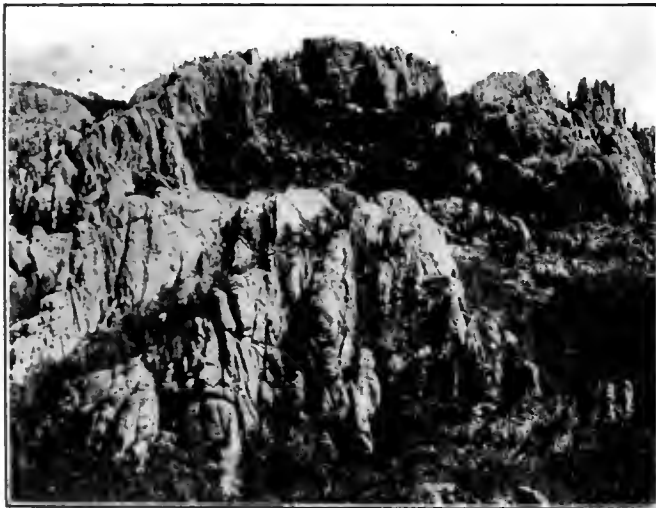
The Lure of the Black Hills

Earl Emmons---The



SYLVAN LAKE IN THE BLACK HILLS

*Shimmering jewel, as crystal clear,
Clearer, methinks, than an Angel's tear
Held in a setting of peak and pine
Wrought by the hand of the Great Divine.
Deep as the love in a woman's eyes,
Mirror of Nature serene it lies
Flashing reflection of hill and brake—
Gem of the Black Hills—Sylvan Lake.*



THE WONDER OF THE BLACK HILLS

*Oh pa-ha-sa-pa, God was doubly kind
When you He made, with all your wondrous charms;
Your tow'ring peaks with bounding plain behind,
Your sparkling streams whose far outreaching arms
Embrace a wealth of beauty vast and rare,
Of rugged canyons, gushing streams and rills,
'Neath azure skies and sweetly scented air—
A Nature's Paradise—the Great Black Hills.*



HARNEY PEAK OBSERVATORY—7240 FEET HIGH

*Lord of the heights and the circling space,
Monarch of peaks and the distant plain;
Lifting a lofty and rugged face
High over all in a calm disdain.
Holding a vision of four fair states,
Scorning the gale and the lightning streak;
Gazing serene into Heaven's gates
Crown of the Black Hills—Harney Peak.*

By One Who Knows Their Spell

“Poet of Harney Peak”

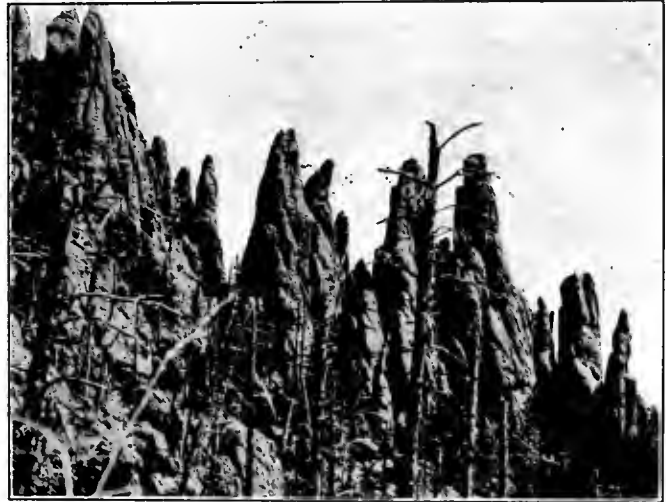


“GUARDIAN OF THE POOLS” AT SYLVAN LAKE

*Ah, Frozen-face, with melancholy pose,
With cold, sarcastic smile and deadened eye;
What means that stubborn jaw and upturned nose?
Why show such gloomy face—I ask thee—why?*

*Oh why so silent-lipped and sternly grim?
How can thy eye remain so chill and dull?
What seest thou beyond yon distant rim?
What secret thoughts lie in that granite skull?*

*What soured thy disposition, Pompadour?
The world is not so hopeless as it seems;
Come on, don't be a pessimistic bore—
Brace up and grin—forget thy grouchy dreams.*



THE NEEDLES OF THE BLACK HILLS

*Stately and grand in a row they stand,
Cloaked in a somber hue,
Shaming the pines with their slender spines
Piercing the azure blue.
Silent and gray in a vast array,
A vision that awes and thrills;
Holding sublime in contempt of time—
The Needle Rocks of the Hills.*



“THE WHITE RIVER”—BAD LANDS

*Ghastly and weird with your jagged peaks
Bleached to the color of dead men's bones
Gloomy defiles where the wild wind shrieks
Hideous menace in ghostly groans.
Nakedness slashed with a bloody red;
Caverns where demons alone could dwell;
Land of despair and of things long dead—
Bad Lands, forsooth, and an unlit Hell.*

THE PENN STATE DEMONSTRATION FOREST

BY J. A. FERGUSON



EVEN-AGED FOREST



UNEVEN-AGED FOREST



ALTERNATE STRIP CUTTING

FEW if any forest schools in the country are so located that students can be taken to the woods to see carried out practically or ideally the various methods of cutting forests to secure reproduction. Photographs and lantern slides of forests managed by different silvicultural methods are of value in instructing students, but often fail to present the methods clearly.

The author has felt for some time the need of a mechanical demonstration forest by which the different methods of cutting could be shown to students. Such a forest has been devised and has proven workable. As shown by the photographs the apparatus consists of a heavy table perforated with holes through which dowel sticks with sponges representing trees are able to move freely. This table with its back and sides in box form can be moved up and down over a similar three-sided box form, inverted. On the sides of this latter form, cleats are nailed on which shelves can be placed. When the table is lifted the trees are lifted by the sponges. When high enough a solid shelf can be placed on the top cleats. When the table is then lowered the trees will strike this shelf and rise through the table, presenting the even-aged forest shown by the photograph.

A second shelf through which holes have been properly bored can now be placed on a lower shelf. When the top solid shelf is withdrawn the trees will fall to the second shelf, some of them passing through the holes. If holes are bored to represent an alternate strip method of cutting the result is illustrated by photograph. Other shelves can be used to show the different methods of cutting forests. By means of a series of shelves arranged at different elevations an uneven-aged forest can be developed. The demonstration forest can also be used to show methods of thinning forests by using shelves having holes closed by cardboard or metal disks which can be controlled, allowing the trees to be thinned out to fall through. The normal forest can also be shown by means of a series of shelves with properly located openings.

FORESTS OF LITHUANIA

WITHIN its present borders, Lithuania has nearly two million acres of forest land of which 46 per cent is the property of the state, says the Bureau of Foreign and Domestic Commerce in a recent consular report. The principal woods are pine and fir. About 60 per cent of the production of the State forests is consumed in the country and 40 per cent is available for export. In general, Lithuanian timber is considered a high quality. Many of the forests consist of trees of comparatively great age—pines 120 years old, firs 100 years old and oaks that have stood from 150 to 400 years. About one-half of the 6,750,000 acres of forest within the former boundaries of Lithuania belonged to the estates, and nearly all the rest to the Russian crown.

BERRY-BEARING PLANTS

BY F. L. MULFORD

ALTHOUGH to the unobserving the winter landscape may seem dull and uninteresting yet to one who has learned to see there are many beautiful and interesting things even when the leaves have all fallen and the grass has turned brown. Were we of the east as enthusiastic about the place of our abode as our western cousins we would sing the praises of the rich browns of the winter fields, the grays, browns, yellows and reds of the winter stems, and the deep greens of the winter foliage of our evergreens be they coniferous or broad-leaved instead of taking all as a matter of course or what is more likely never seeing these things at all.

Especially on the small grounds of the modest home are these items of the greatest importance, because here the members of the family are brought into close contact with every detail so that if there is any tendency to observe at all these various characters are seen. Of course every well-planted home lot has in addition to the flowering shrubs of spring and summer some evergreens to give winter cheer but not so many as to make the place look too penned up. Then too the different colored barks show with greater contrast against a background of evergreens. But in order to really attract attention to the beauties of the out-doors after the leaves have gone it is desirable to use some of the winter berry-bearing plants to halt the hurried passerby and hold him long enough to really see the things that are about him.

For example a bush filled with bright red berries after the leaves have gone will attract and hold the eye long enough to set the person to thinking and make them realize that there is something worth while to be seen in the humdrum of his life and before it is realized the beauties of the surrounding plants have found their way into his recognition. But to the home lover such added bits of color are a continual source of satisfaction and when appropriately placed add greatly to the beauty of the home surroundings.

Plants with bright red berries are those that are most showy and so are the ones first noticed and first considered in making plans for planting berry-bearing plants. Of the red berries plants probably the high bush cranberry (*Viburnum americanum*) is one of the best-known of our natives, especially in the northern states. There is a European form of the same plant (*Viburnum opulus*) that is not so attractive in fruit although it too is worthy of planting and in fact is not far behind the American form in ornamental value. These plants are especially valuable in the northern part of the United

States although they do well nearly all over the country. The European form is the parent of the common snow-ball. The high-bush cranberry has foliage that seems less liable to mildew than that of the snow-ball and has the added attraction of berries well into the winter. As other food becomes scarce birds are apt to eat these berries so that they are gone before spring and often early in the winter. The plants attain a height of eight feet. Next in importance of the red berries is the barberry. A few years ago these were best known in New England by the so-called common barberry a plant introduced from Europe, but that has become naturalized over much of New England and in many other states. This plant is now outlawed because it harbors the wheat rust fungous which does so much damage in wheat-growing sections of the country. Its near relative,



HIGH-BUSH CRANBERRY
(*V. opulus*)

A fine, strong plant and very popular. The fruit hangs on all winter, and in Canada is often used for jam.

the Japanese barberry, has not acquired this habit of keeping bad company and is an even more attractive plant than the common barberry. Its berries are somewhat smaller and do not swing quite so freely and gracefully from the stems, but they are more plump and solid and remain on the bushes much longer. The birds do not eat these berries as a rule until other food becomes scarce. These plants form small to medium-sized compact masses of prickly stems covered with small leaves bronze and pea green when young, changing to dark



COMMON BARBERRY
(*B. vulgaris*)

A shrub growing eight feet high, with graceful arching branches and long clusters of red fruit.

green when mature and turning a brilliant red in the fall. These plants attain a height of four or five feet.

The flowering dogwood that is so common in early spring all through the eastern half of the United States is also attractive all through the fall and early winter because of its abundant large red berries. The especially attractive arrangement of the branches of this tree in layers adds to its appearance at this season of the year as well as in spring and summer. It will eventually attain a height of twenty or thirty feet, but because of its slow growth it can often be used where a tree fifteen feet high is desired. Both the red and the white flowered forms are free fruiting. Its foliage also is an attractive feature in the autumn landscape as it turns a beautiful red before dropping.

For the northern half of the country especially, the mountain ash is another attractive small tree that has deep orange berries well into the winter. They also have white flowers in early summer. The foliage is also attractive, being a dark green and much divided. The most common one in cultivation is the European species (*Sorbus aucuparia*), but the American one (*S. americanum*) is better except possibly along the New England coast, where the atmosphere is particularly moist. This latter is not generally carried by nursery men and so is more difficult to procure.

The southeastern section of the United States has an-

other most handsome group of plants that are evergreen as well as having berries that hold all winter. These are the hollies, of which some thrive along the coast as far north as Boston. The largest and handsomest of these is the American holly, that is native as far north as Long Island and grows in protected places throughout southern New England, and as far north as Cincinnati and St. Louis. This is a handsome plant that eventually makes a large tree, but because of its comparatively slow growth may be used to advantage where an evergreen is needed that attains a height of twenty feet in the northern limits of its range. This plant has the two forms, the berry-bearing and those that do not bear berries. The practice of grafting these plants in order to insure the berry-bearing form has not been adopted by nurserymen, the practice being more common to wait until the trees are old enough to fruit and then selecting the berry-bearing form. These will not fruit without there is a staminate tree near. This means that in a community where there are not already a number of hollies the planter must be sure to secure both kinds. Because of the scarcity of these plants in nurseries and the uncertainty of being able to get just what is desired probably the sensible thing for the planter to do is to secure several small plants and make a clump planting wherever he is desirous of developing a tree and then gradually eliminating all but the specimen that he finds to have the characteristics he desires for the particular



JAPANESE BUSH CRANBERRY
(*V. dilatatum*)

A very rare shrub that is brilliant red and holds its numerous red berries all winter. Usually grows about three feet high.

location. In addition to the American holly there is the English holly (*Ilex aquifolium*) that is also primarily a southern plant, but that is hardy as far north as Washington. It is not as hardy as the American holly. There are several varieties of the English holly with variations in habit of branching and especially in shape and texture of leaves, all of which are more glossy than the American holly.

Another showy holly is the black alder, a deciduous plant that has its stems almost completely covered with bright scarlet berries that turn by the middle or last of October and hold on well toward spring. In some communities it is spoken of as the Christmas berry. It, too, must have plants of both sexes in order to insure fruiting.

gins of the leaves. There are many other species that are good and hosts of others that have been described, that in any other genus of plants would be classed as horticultural varieties if they were recognized at all. The Washington thorn (*Crataegus cordata*) holds its fruit longer than many of the others. For most of the country the native thorns are better suited for ornamental planting than the European kinds, as the foliage keeps in better condition through our hot dry summers. There are also some evergreen species that are often planted.

Another group of small trees and shrubs that are showy in late fall and early winter is the euonymus. Here again there is a native species that is most useful and



BLACK ALDER, OR WINTER-BERRY

(*I. verticillata*)

This is the familiar red berry so often tied into Holly wreaths for the Christmas trade. The plant is occasionally found on Long Island, in upland hedge-rows and swamps.

JAPANESE BARBERRY

(*B. Thunbergii*)

This is a valuable shrub for edging down taller groups, because its thick growth holds the blowing leaves. It is used very extensively for hedges.

GRAY ALDER

(*Ilex laevigata*)

A member of the Holly family, this is covered with orange-red berries in the early fall. Popular for house decoration combined with evergreen leaves.

The flowers of all the hollies are inconspicuous.

For the south the yaupon (*Ilex cassine*) is an attractive shrub or small tree of rather upright growth. It fruits freely and is a useful plant for hedges as well as for more free growing effects. Its berries are also scarlet. It is native as far north as Wilmington, North Carolina.

Another large group of red fruited small trees are the thorns, among which the common cockspur thorn (*Crataegus crus-gali*) is one of the most satisfactory. It is beautiful in spring with its clusters of white and bluish flowers as well as in fall with its berries. Its foliage is also attractive throughout the summer, as it is of a good clean green made more attractive by the irregular mar-

ornamental that has been neglected in the past for a European species that is not as well adapted to our climate. The showy fruits of these plants consists of a purplish angular seed pod that ultimately splits open, exposing the orange or scarlet berry seed that hangs in the pod for quite a long time. On some of the species these fruits hang on well into the winter, especially in the north. The common burning bush or wahoo of our western states (*Euonymus atropurpureus*) is one of the good species, the berries being orange. The foliage turns pink and red in autumn and hides the berries until the foliage drops, but the fruits hang on well into the winter. The most common form in nurseries is the spindle tree (*Eu-*



AMERICAN HOLLY
(*I. Opaca*)

About the best known and loved of our Christmas evergreens. Two or three holly trees in a shady corner in the garden will be a source of pleasure all the year round.

onymus europaeus). The winged spindle tree (*Eunonymus alatus*) is a Japanese plant that forms broad bushes up to a height of twelve feet and is wonderfully prolific in fruiting, but best of all they hang on well into the winter. The branches of this plant are covered with wing-like protuberances of a corky nature that adds much to the winter appearance when seen at close range.

Another large group of plants that add brightness to the winter landscape is the wild roses, including some introduced species. Probably the most popular and most widely grown is the rugosa or ramanas rose (*Rosa rugosa*). This is attractive because of its heavy rough foliage as well as its winter hips that hang on well toward spring. The usual form has deep rose-colored single flowers while there is another equally good that has white flowers. Most of the named hybrids are lacking in the attractive winter hips that are so abundant on the species. In addition to this exotic species the native wild roses are most of them attractive in winter both for their hips and their bright stems. The hips are many of them even brighter than those of the rugosa rose and hold longer in a bright fresh condition. Among these are

the shiny-leaved rose (*Rosa lucida*) the Carolina rose (*R. multiflora japonica*), which has clusters of small many others, including the half climbing Japanese rose (*R. multiflora japonica*), which has clusters of small white flowers followed by small bright red hips in clusters.

In addition to trees and bushes already mentioned there is a dwarf euonymus that is useful for a low under shrub growing from one to three feet high and bearing the characteristic fruits of this family. This is *Euonymus canadensis*, with orange berries. Another one of this family is a vine that can be used in place of English ivy and is hardy farther north than the ivy. This is *Euonymus radicans*, an evergreen plant that bears orange-colored fruits abundantly on the fruiting forms.

There are also two other vines that have showy berries, one is the false bitter-sweet (*Tecoma radicans*), that bears orange berries that are released from oval capsules in the manner that the fruits of *Euonymus* is released holding in the capsule for several weeks and making an attractive Thanksgiving decoration in those regions where it is native. The foliage is excellent, making the vine most useful where a vigorous dark foliaged

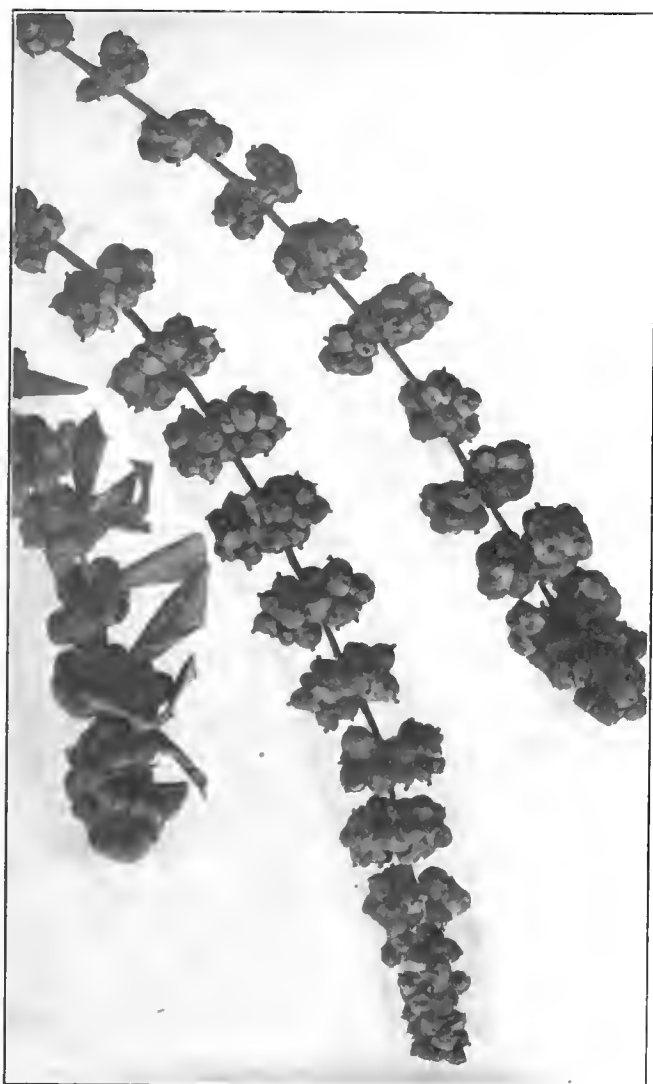


SILVER THORN
(*E. Umbellata*)

A taller growing species of the Japanese Silver Thorn, producing masses of red berries. It will grow twelve feet high and is a fine addition to any shrub border, producing winter feed for the birds and adding a bright touch of color when the leaves are gone.

plant is desired. The other plant is as often seen as a trailing shrub as a vine, but is useful in either way. It is the matrimony vine (*Lycium chinensis*) and bears two crops of berries a year, one ripening in June or July, and either dropping soon or is eaten by birds, while the other ripens in September and October and holds on most of the winter. The foliage of this is paler green than that of the bittersweet. It is native of the Orient, while the bittersweet is one of our American plants.

In addition to the bright red winter berries there is a plant with purplish red berries that is native all over the country. This is the coral-berry, some times called "Indian currant," known in the west as buck-bush (*Symphoricarpos vulgaris*), and is even listed sometimes by nursery men as "red snow-berry." It spreads by the rooting of the tips of the branches and its whole habit of growth is a little less trim and finished than many of the plants mentioned. On the other hand, it holds its berries well into March, even southward into the Carolinas and is a most valuable shrub for winter effects where a plant under five feet in height is desired. It is



SNOW-BERRY
(*Symphoricarpos racemosus*)

This is an old-fashioned shrub with large pure white berries, growing usually about three feet high.



JAPANESE TURQUOISE BERRY
(*Symplocos paniculata*)

Here is indeed something new—berries as blue as robins' eggs! It is a rare and lovely shrub and in September and October is loaded with berries, which the birds quickly demolish.

hardy and naturalizes well.

The Callicarpa, also called sometimes calico bush (*Callicarpa purpurea*) is another of our native plants that is a valuable ornamental. It has clusters of small berries at the tips of the branches like the coral-berry, but they are regular in size instead of having large ones and small ones all crowded together in a close bunch as does the plant just described. The callicarpa is tender north of Philadelphia except in favored locations, but is a valuable addition to the list of berried shrubs for places farther south.

Although stress has been laid upon the scarlet and orange-colored berries those plants with black berries also have a useful place in the winter landscape. Of course those berries with more or less of red in their coloring can be seen for greater distances than those of quieter hues and for that reason are approximately more largely considered when planning the winter picture. On the other hand the black berries are also attractive

and when silhouetted against the sky or with snow as a background they are especially noticeable.

Among the plants with black berries the privets are probably the most common in cultivation. All the privets that are permitted to grow in a sufficiently natural manner as to bear flowers will also set an abundance of berries. With the severe pruning to which the privets are usually subjected there is little chance for them to bear their dainty but beautiful flower clusters. The berries are borne in clusters well above the foliage as a rule. Many do not realize that the privets are good for anything but hedges, but they make beautiful shrubs when permitted to grow without being mutilated by the pruning knife. They vary in height from six or seven feet to nearly or quite thirty feet.

Some of the other plants with black berries are Viburnums like the arrowwood, which is a native shrub growing about six feet high that in spring is covered with clusters of small white flowers followed by clusters of blue or blue-black berries that

hold on well into the fall. The black haw (*Viburnum prunifolium*) is another though larger shrub that holds its blue-black berries well after frost. This shrub attains a height of fifteen or twenty feet, but has flowers similar to the arrowwood and like it is a handsome plant when in full bloom. They both flower in late spring. There are a number of other Viburnums

with blue-black or pinkish berries, but they ripen and fall before winter really comes.

The white kerria or rhydotypus (*Rhodotypos kerrioides*) is a shrub that bears shiny jet black berries singly all over the bush and they hold on until the next year's foliage is well advanced. The flowers are white and about the size of those of the philadelphus or (mock-orange of the northern states (*Genus Philadelphus*), although there are but four petals as contrasted with the five petals of the Philadelphus. Its foliage is wrinkled and a rather light green rather similar in general effect to that of the kerria.

The bayberry (*Myrica cerifera*) is a white berried plant that holds its small white fruit well into the winter. It is native on the light lands near the sea-coast and in these situations it is particularly abundant. It is evergreen but the white berries packed closely along the stems are rather conspicuous and used in front of evergreens the effect would be pleasing. It is especially adapted to the coast regions and

lighter lands. Plantings on heavier soil should be made in an experimental way. In addition to the vines already

mentioned some of the ornamental grapes or ampelopsis, as they have been called at different times are valuable for their bluish berries that hold well into the winter. These berries on the most available form Ampelopsis heterophylla (*Psedera heterophylla*) are white and pinkish heavily



RED CHOKEBERRY
(*Aronia aubatifolia*)

This is a native shrub not often seen, laden with bright berries all winter long.

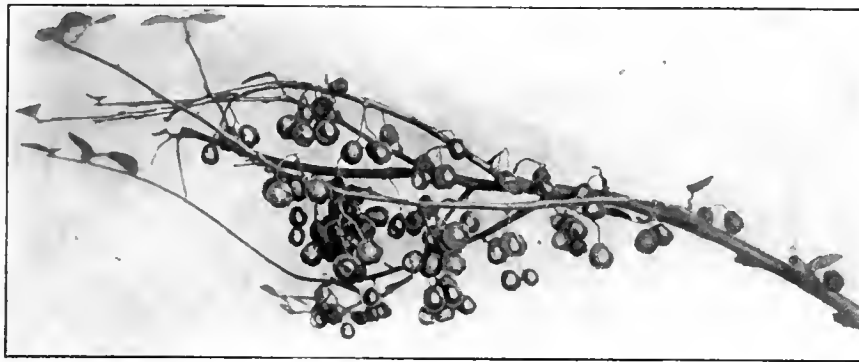


CHINESE CHRISTMAS-BERRY
(*Photinia villosa*)

This is often combined with the Chinese Turquoise Berry and the Japanese Bittersweet and they make a very showy effect in October and November. The berries are like those of the Cotoneaster and the Juneberry, and feed the birds a long time.

overlaid with different shades of blue. They hold on the vine most of the winter. The foliage is a prettily mottled green with tinges of yellow and pinkish tints, but not sufficiently pronounced to be called variegated.

There are many other berry-bearing plants, some of which hold their fruit throughout the winter, but a large number of



COTONEASTER
(*C. divaricata*)

This is one of the newer introductions in berry-bearing plants from China. The shrub is particularly valuable for the scarlet berries which are produced in great abundance in the fall. The plant has a branching habit and grows about six feet tall.

provide food for the birds as well as ornamentation to the garden. The list discussed will give an insight into the possibilities for the northern gardens as well as suggestions of a few of the many good things available only for southern gardens. (Photographs by courtesy of Isaac Hicks & Sons Nurseries.)

QUESTIONS AND ANSWERS

Q. Please advise us what kind of trees would produce the quickest shade that is adapted to this climate. Also when is the proper time to trim holly trees?

A. B. C., Pikeville, Tenn.

A. The trees that would grow the most quickly with you would be some of the poplars followed closely by the silver maple, but these trees are all of them so subject to injury by wind at an early age that their planting should be avoided in climates suited to the growth of better trees, such as yours.

Of the good trees for producing shade the American elm, the tulip or tulip poplar, and the red oak are probably the fastest growing. Other good trees of a trifle slower growth are the basswood, pin oak, scarlet oak, sycamore, and following this the red, sugar and Norway maples, with the white oak not far behind on soils on which it thrives.

The best time to trim holly trees is just as they are starting into growth in the spring, before the new growths are a fourth of an inch long. The time just previous to that is better than later, especially if much wood is to be removed.

Q. What trees should be used for planting a wind-break near San Francisco, California, on land 1,000 feet high 4 miles from the ocean and subject to strong ocean winds and heavy fogs?

L. R. D., San Francisco, Cal.

A. *Eucalyptus viminalis* has been largely used for wind-breaks on the peninsula south of San Francisco back of the ocean hills. On the ocean front the live oak also called coast live oak withstands the wind admirably. It would seem wise to plant several species together to mutually support one another and eventually partially or entirely remove the least desirable. Such a combination might be live oak, Monterey cypress, bay, Russian olive and *Eucalyptus viminalis*. The live oak is the best but is somewhat slow in growth. The other plants would grow more rapidly and although they might have part of their tops destroyed by the strong winds they would afford some protection to the live oak so that its growing tips would not be as likely to be injured as though it had no such protection, and thus its net growth per year would be greater. Close planting will also help by crowding the plants into upright growth.

Q. Can you give me a remedy to prevent the leaves on the buckeye or horse chestnut becoming yellow and dropping off so very early in the summer. I have a tree on my lawn that is

very beautiful. Just now foliage nice green, but in a few weeks the leaves in towards the center will begin to turn yellow and drop off and gradually work out to the outside and by the middle of July the tree will be bare of leaves. I would be pleased to have you advise me of some way to prevent this condition.

M. H. H., Pittsburg, Pa.

A. In response to your inquiry there seems to have been little investigation made of the disease of the horse chestnut and buckeye that causes the dropping of the leaves. It is probable that sprayings with Bordeaux mixture as used for fruit trees, applied the middle of May, the first of June and the middle of June would be helpful although there appears to be no record of control by this method having been carried out. Such treatment would be expensive unless the use of a spray outfit adapted for spraying street trees is available. The spray machines ordinarily used for orchard work are not powerful enough and are not equipped to throw the spray material into the top of shade trees.

Q. I am writing for information regarding the care of a Hemlock hedge. We have succeeded in getting young Hemlocks to grow around our yard, which we are endeavoring to form into a hedge, and I wish that you would kindly let me know about cutting them back, that is how far to trim them each season and what part of the year this had best be done. Also, regarding the mulching of the young trees; should the leaves that fall from surrounding maples be taken away in the spring, or should they be left around the base of the tree undisturbed? This is their second summer and the trees range from about 2 to 4 feet in height.

A. L. S., Alderson, Pa.

A. April is the time to trim hemlock with you in Pennsylvania, just as they are starting into growth. You can safely cut off about one half of the length of the branches covered with good foliage. You could do this on the larger plants and leave the smaller ones untrimmed or nearly so. Next year the larger plants could be trimmed back to the same point as this year and the smaller plants could be trimmed to a corresponding height. The plants trimmed this year will put out many side branches so that trimming them back next year to the same point as they were trimmed this year will still leave ample foliage on them.

LABELING THE CAPITAL'S TREES



LIEUT.-COL. C. O. SHERRILL

Who has charge of Public Buildings and Grounds at Washington, D. C. He recently received from President Harding the Distinguished Service Cross for valor in action at the Argonne.

FOLLOWING suggestions that the trees in the parks of the national capital be labeled so that visitors from all over the world who visit the parks may know them, Lieut.-Col. C. O. Sherrill, who has charge of Public Buildings and Grounds, has chosen a label. This will give both the common and scientific name of the tree, and will be a feature much appreciated by the thousands who daily go into these parks. The style of label and the plan of marking the trees might very well be adopted by other cities.

In describing the plan Lieut.-Col. Sherrill says:

"The label consists of a base, so designed as to be bent approximately to fit the par-

ticular tree on which it is used. On the face of this base is riveted a plate, upon which will have been previously stamped the botanical and the common names of the trees. The plate is then screwed with screws to the trunk of the trees sufficiently high up to prevent its being damaged by children and yet not too high to be clearly seen by persons interested in tree nomenclature.

"A number of different methods have been tried in the District for labeling trees, but none have ever proven entirely successful in that some became detached and carried away by souvenir seekers. It is believed that the size and weight of this label and the printing on the face, which clearly indicates the fact that it belongs to the Government, will deter souvenir hunters from carrying these labels away. If the plate containing the name alone, should be pried loose it can be readily replaced at very small expense. The screws used to attach the label to the trees are placed one above the other so that the growth of the tree will not pull them out, and it is believed that they will not do any damage to the tree. There will be a thousand of these labels put in position at the most necessary places during the present Fall.

"I desire to give Mr. Frederick D. Owen, the office architect and engineer under the Office of Public Buildings and Grounds, full credit for the work in designing this type of tree label."

Because of the great interest shown all over the country in the labeling of trees in the District, it is reasonable to suppose that many other cities will follow Washington's example and label their local trees. In many towns, especially throughout New England, there are trees of wonderful interest and historic value. Such cities might do well to adopt a similar label to that being used in Washington, the design of which is simple, dignified and beautiful, and at the same time, most practical.



LABEL FOR TREES IN THE PARKS OF THE NATION'S CAPITAL

SOME WOOD BORING INSECTS

BY FRED J. SEAVER, CURATOR, NEW YORK BOTANICAL GARDEN

OF all the destructive insects, the borers are the most obscure and difficult to control by artificial means. This is due to the fact that they "dig in" and resort to "trench warfare," with the result that during the greater part of their life cycles the insects themselves are unseen, their presence being indicated by the external symptoms only. In some cases these symptoms furnish a very accurate index as to the nature of the trouble, but

following reasons: The active growing portion of the trunk of the tree is that just under the bark while the greater part of the wood below this serves merely to give mechanical strength, and, to a certain extent, as a water conducting system, and is not really essential to the life of the tree except as it serves to support the young branches and carry the leaves up where they can be freely exposed to the sunlight. Since the bark-borers often confine their attacks to the actively growing tissues, when abundant enough to surround the trunk they shut off the circulation of food materials and the entire tree or that portion above the point of attack is "girdled" and strangled.

The most of the destructive work is done by the caterpillar or larval stage while the adult which may take

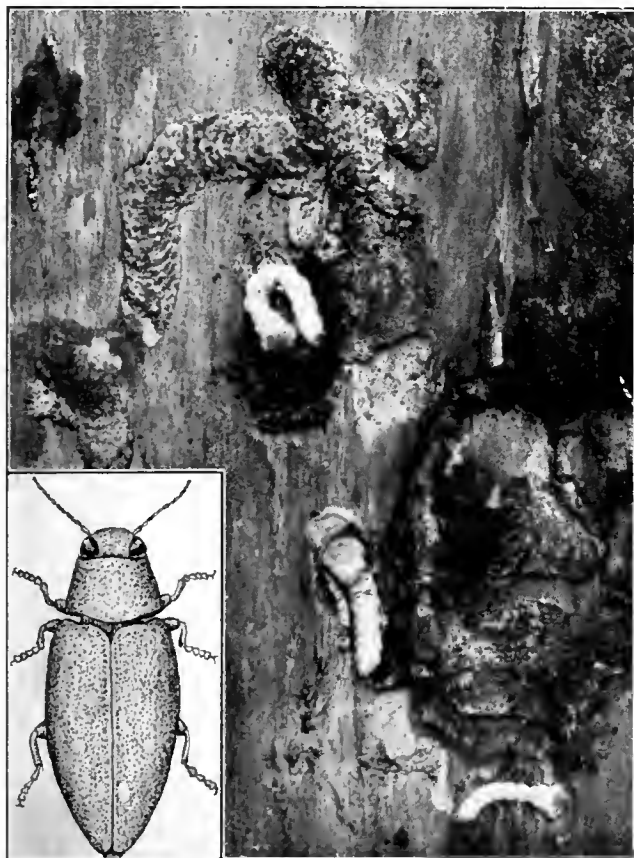


FIGURE 1. HEMLOCK WITH BARK PARTIALLY REMOVED SHOWING BURROWS AND BORERS, ABOUT NATURAL SIZE. ALSO AN ENLARGED DRAWING OF THE ADULT BEETLE

in other cases they are indefinite and often misleading, even to the expert. With a little experience, even an amateur can become familiar with the more common of the wood-boring insects whose ravages are too well known to many and of interest and importance to all tree lovers.

In a general way the wood-boring insects may be divided into two main groups, depending upon their mode of attack. The first of these is the group known as the "bark-borers" or those which work in or just underneath the bark, and the second, the "deep-wood borers," comprising those forms which penetrate deep into the branches or main trunk of the tree. While at first thought the bark-borers might be considered the least injurious, their work is often more likely to prove fatal in a short time than even the deep-wood borers for the



FIGURE 2. WORK OF THE RED CEDAR BORER, ABOUT NATURAL SIZE

the form of a beetle, butterfly or moth, often serves only as the egg laying stage and feeds sparingly. While the work of the caterpillar has been done in obscurity the adult emerges from its hiding place and is usually provided with wings in order to facilitate the process of mating. The adult stage is usually short lived, and, after mating and depositing the eggs, the female soon dies and the young caterpillars again "dig in," often spending one to several years in the larval stage before reaching maturity. While the adult usually feeds sparingly, in

some cases it eats voraciously and continues the destructive work of the larva.

The hemlock bark beetle (Fig. 1), one of the bark-boring insects, is the cause of a large amount of damage to the tree from which it derives its name. The caterpillar is a white grub with a large flat head and when full grown reaches a length of nearly an inch. The larva works just under the bark forming irregularly meander-



FIGURE 3. HICKORY BRANCH WITH BARK PARTIALLY REMOVED SHOWING EGG GALLERIES AND CHANNELS MADE BY THE CATERpillARS OF THE BARK BEETLE. DRAWING OF YOUNG CATERpillar MUCH ENLARGED

ing channels or burrows about a quarter of an inch in diameter and from a few inches to a foot in length. When the work of the insect is completed these burrows are filled with macerated wood resembling fine sawdust and if enough insects are present to girdle its trunk, the entire tree dies. The adult of the hemlock borer is a glistening bronze colored beetle about a half inch long and emerges from its hiding place in the spring through a hole in the bark. The only practical artificial remedy for this insect is the cutting of the infested trees to prevent the spread of the pest to those still uninfested. After cutting the trees the wood should be burned, or at least the bark removed and burned in order to prevent the cut trees from serving as sources of infection. This should be done during the winter and the bark disposed of before time for the adults to emerge in the spring of the year.

The red cedar bark-borer (Fig. 2), an insect similar to the preceding, works in the red cedar giving rise to the characteristic sculpturing which is often evident on red cedar which has been used for rustic work after the

bark has weathered away. Although the red cedar borer is thought to attack dead or weak trees exclusively, it seems likely, from our own observations, that this insect is responsible to some extent at least for the dying of this tree on estates and in our city parks. As with the hemlock borer, rustic work may serve as a source of infection for living trees unless the bark is removed and the insects prevented from maturing.

The hickory bark beetle (Figs. 3, 4) is one of the most destructive of all of the bark-boring insects and one which has received a great deal of attention in the last few years. The first evidence of the presence of this pest is the premature dying and falling of the leaves of the hickory in midsummer, about July or August. Inquiries as to the cause of this premature defoliation of the hickories are frequently received. The leaves may fall to the ground or they may be only partially detached and remain hanging in a dead condition, greatly injuring the appearance of the tree. If the fallen leaves are closely examined, a small cavity will be seen at the



FIGURE 4. HICKORY BRANCH SHOWING HOLES THROUGH WHICH THE BARK BEETLES HAVE EMERGED, ABOUT NATURAL SIZE. THE DRAWING OF THE BEETLE ITSELF IS ENLARGED

base of the petiole. These cavities have been made by the adult of the hickory bark beetle which feeds upon the tender tissues at the base of the leaf so weakening the stem that the leaf is easily broken from the tree by the wind or partially detached as described above. If this insect would confine its attacks to the leaves and small twigs the injury would be comparatively slight, but unfortunately, they also attack the large branches or main trunk of the tree and it is here that the principal part of the damage is done.

After mating the female of this insect bores a hole directly through the hard outer bark of the hickory making a burrow about an inch in length, just underneath. This burrow is known as the egg gallery since the eggs are deposited on either side of the cavity and range in number from twenty to forty for each adult. The female usually dies soon after depositing her eggs and her remains can often be found in the old egg gallery. The larvae, small white grubs reaching a length of a quarter of an inch when full grown, hatch in a short time after the eggs have been deposited and immediately begin to work their way outward in either direction at right angles to the original cavity, each larva making a

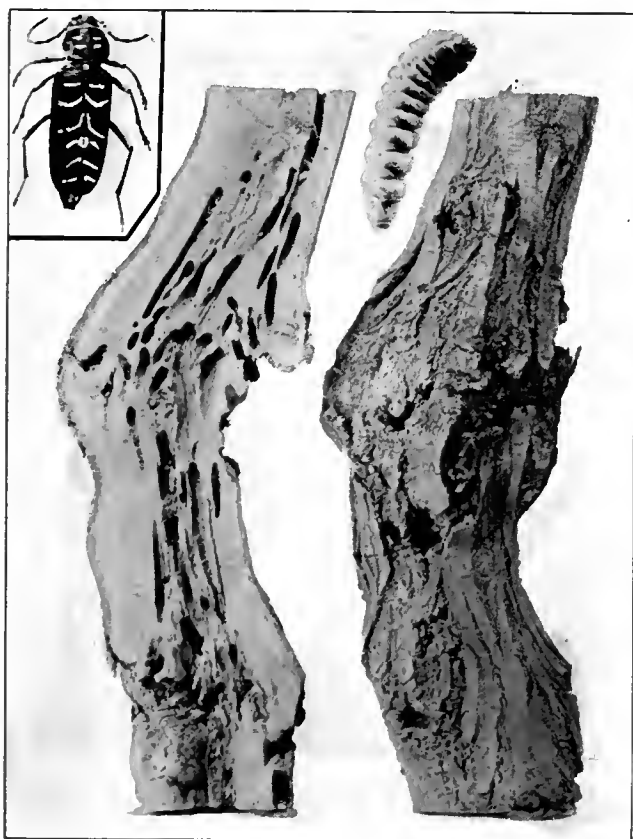


FIGURE 6. BRANCH OF BLACK LOCUST HONEY-COMBED BY BORERS, ABOUT ONE-FOURTH NATURAL SIZE. PHOTOGRAPH OF CATERPILLAR AND BEETLE ABOUT NATURAL SIZE

separate channel which grows larger as they proceed outward on account of the increase in the size of the caterpillar. These burrows will explain the strange markings to be found under the bark of dead hickories. The larvae remain under the bark until the next spring when they emerge by eating their way through the hard outer bark, leaving it with the appearance of having been riddled with shot. The only artificial means of controlling this insect is similar to that proposed for other bark-borers, *i. e.*, cutting and destroying infested trees in order to check the spread of the pest.

The European leopard moth (Fig. 5), among the deep-wood borers, is one of the most destructive where it has become established, having, as its name implies, been introduced from Europe. The name "leopard" is suggested by the spotted markings of both the larva and adult

moth. Its omnivorous habits render it more destructive than many of the deep-wood borers since it preys on almost all kinds of deciduous trees, especially the maples, lindens and ashes. Like many of the deep-wood borers this insect does not bring about immediate death by

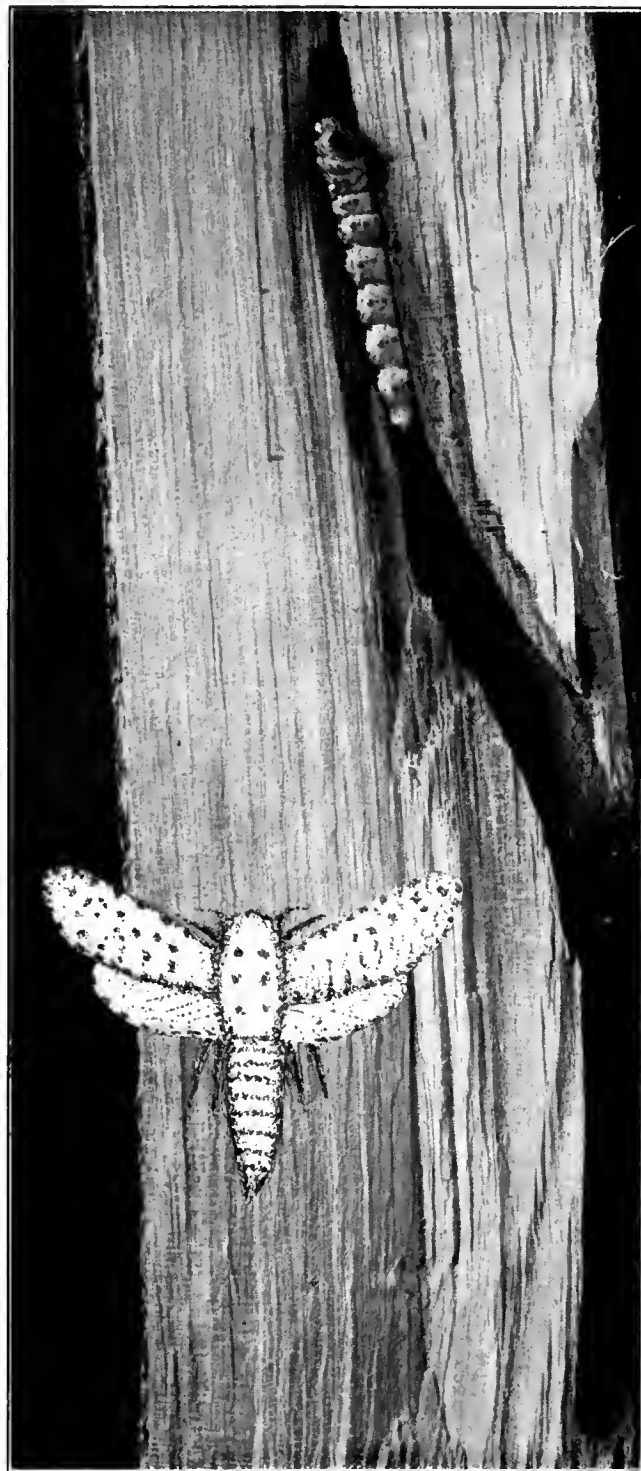


FIGURE 5. MAPLE BRANCH SHOWING BURROWS OF LEOPARD MOTH WITH CATERPILLAR, ABOUT NATURAL SIZE. DRAWING OF ADULT MOTH ALSO ABOUT NATURAL SIZE

girdling as is so often the case with the bark-borers, but its injuries are more indirect, resulting in a weakening of the branches through mechanical injury which, with the subsequent decay, causes them to be-

come disfigured and finally often broken from the tree.

The eggs of the leopard moth are deposited in masses of several hundred each in the crotch of a branch or in crevices in the bark. On hatching, the young caterpillars begin their work in the smaller branches, feeding on the plant tissues and rapidly increasing in size until at maturity they reach a length of two inches. When partly grown, the caterpillars leave the small branches where they begin their work and migrate to larger ones or in the case of a comparatively small tree, to the main trunk. Here each caterpillar excavates a cavity about an inch broad and several inches long just under the bark. It then begins to work toward the heart wood leaving a channel one-half inch in diameter and about six inches long. The writer has personally observed a partly grown caterpillar of the leopard moth in the act of boring its way through the solid wood into the main trunk of a silver maple.

After entering the tree the hole, through which the caterpillar has entered, is entirely concealed by a web which is spun for the purpose so that it is almost impossible to detect the presence of the insect except by the characteristic wood pellicles which are thrown from the burrow. This is usually done at night after which the opening is again closed.

It requires two years for the leopard moth to complete its life cycle. The caterpillar remains in a dormant condition during the first winter and resumes feeding the next spring, attaining its full size toward the end of the second summer. A second winter is passed in the larval stage and the next spring the pupae are formed near the entrance which later becomes the exit. The adult moth emerges in early summer, being most abundant in late June or early July. Being nocturnal in its habits the adult moth is not so frequently seen.

As previously stated, the artificial control of this insect is not easily effected. Some beneficial results can, however, be accomplished in the case of a comparatively young tree when the attack is in the main trunk or larger branches within easy reach. When its presence has been detected by the presence of the wood pellicles on the ground underneath, on account of the large size of the cavity the caterpillar can be drawn from its burrow by means of a wire provided with a hook or barb at the end. Or the caterpillar can be killed by injecting a poison, such as bisulfid of carbon into the burrow. While this might seem to be a rather crude or slow process, when we recall the fact that each adult female when she emerges is able to deposit several hundred eggs, the effectiveness of this remedy in checking the spread of the insect is more easily appreciated. After removing or killing the caterpillar the wound should be treated so as to prevent the decay which is likely to follow.

The locust borer (Fig. 6) is another deep-wood borer which is responsible for a great deal of damage, but fortunately, its restricted habits render it much less destructive than the preceding. The insect attacks only the black locust (*Robinia*), but here it is capable of such devastation that it has rendered impracticable the cultivation of this tree either for ornamental or for commercial purposes.

The keeping qualities of the wood of the black locust are such as to recommend its growth for various purposes where great resistance to decay is required, especially for railroad ties. Consequently one railroad company, a few years ago, under supposedly expert advice, planted more than two millions of seedlings to be grown for ties. In the course of a few years the entire plantation was ruined by the attacks of this and other insects so that the project had to be abandoned. Photographs of this plantation might easily be mistaken for those of a bullet-riddled forest from a European battlefield.

The adult stage of the locust borer is a large, beautifully striped beetle nearly an inch in length, the black wing covers with their yellow stripes giving them a very attractive appearance. It is a very active insect and may often be found flitting about goldenrods and other bright colored flowering plants where it feeds rather sparingly on the pollen from the flowers and where undoubtedly its own bright colors serve as a device to protect the beetle from being detected by its enemies. The beetle is short lived although apparently very optimistic and dies soon after completing the process of reproduction. After mating the female soon flies back to the locust tree where her eggs are deposited in the soft tissue just underneath the bark. The young larvae soon hatch and burrow into the wood where, unlike the leopard moth, they complete their life cycle one year from the time the eggs are deposited. The larva, when full grown, is a white grub about an inch in length and a voracious feeder.

The channels are about the size of an ordinary lead pencil. The wood which is chewed up, is passed through the body, the digestible parts taken out, and the refuse deposited in the form of rather coarse sawdust-like particles. This partially digested wood is thrown out in such large quantities as to form little heaps at the base of the tree when badly infested. The wood is often so thoroughly honey-combed by the grubs that the entire tree is distorted and the branches easily broken from the tree by the wind.

Since boring insects are difficult to combat by artificial means, it follows that we must depend largely on their natural enemies for their control. The most important of these natural enemies are the birds. Some one has said that the woodpeckers are the natural protectors of our forests and woodlands and certainly no bird is better equipped for warfare against boring insects. With its chisel-like beak, its sharp barbed tongue and its keen sense of hearing, it is sure death to the shallow boring insect. One block of hemlock about ten inches long and eight inches in diameter showed upwards of a hundred shallow holes made by woodpeckers in search of insects. Just how many were obtained it is difficult to say but knowing the habits of the bird it is safe to say that the work was not in vain.

While the woodpeckers go after the grubs the flycatchers prey upon the adult. Too much cannot be said in favor of offering protection and encouragement to our "feathered friends" upon whom we must depend very largely for protection against the ravages of the boring insects.

THE MOUNTAINS OF NEW ENGLAND

BY ALLEN H. BENT

(Photographs by the Forest Service)

IT seems to be generally recognized that playgrounds are necessary adjuncts to our civilization and that mountainous regions make the best playgrounds. Naturally the hill places within easy reach of the large centers of population are bound to be used the most; but the people who most need their health-giving ozone, their beauty, their inspiration, do not always know where or when or how to go. On one thing only are they agreed, that vacations, like sugar-coated pills, are easy to take.

As Switzerland is the playground of Europe, so the mountains of New York and New England form the principal playground for the dwellers in the busy cities of northeastern United States. The dwellers in our northwest are fortunate in having Mount Rainier and

conditions within easy reach. Emerson called Monadnock a "link in the Alps' globe-girdling chain". The White Mountains and the other heights of New England, are in the broadest sense a few more links in the same chain, but more specifically they are a part of the Appalachian chain, which begins with the heights of Alabama and Georgia and ends fourteen hundred miles to the northeast, with the Shickshock Mountains of the Gaspé peninsula. The name Shickshock has a sort of fascination about it and some day I hope to brave the hordes of black flies and mosquitoes that are reported to haunt the region and penetrate its fastnesses, for as every traveler up the St. Lawrence knows,

The mountains of Gaspé are fair to behold,
With their fleckings of shadow and gleamings of gold.



TYPICAL OF THOUSANDS OF SPOTS IN THE ADIRONDACK MOUNTAINS IN NEW YORK

This shows Whiteface, from Wilmington Notch. The forests comprise white pine, red spruce and hardwoods and the logs in the stream are white pine. Perfect recreation country in the East.

the other snow-covered giants of the Cascade Range for their holiday outings; but let us of the northeast be content with what we have—at least until the railroads lower their fares a little. In winter—and vacations at that time of year are rapidly increasing—we have Alpine

The Taconic Range along the western border of Massachusetts is the link that connects the Catskills of New York with the higher peaks of northern New England. Greylock—the Saddleback of earlier days—3,535 feet, in the northwestern corner of the state, is the highest

in the Commonwealth, and Mount Everett, "the Dome of the Taconics", 2,624 feet, in the southwestern corner, the next loftiest. Both are state reservations, are well supplied with roads and trails and are easily and profitably climbed. The first has a fire lookout upon it, the second a small hotel. Bear Hill, the highest eminence in Connecticut, 2,355 feet, is only four miles from Mount Everett. The Taconic Range, which continues northward along the western border of Vermont for half the length of the state, has had its geological history minutely and interestingly told by T. Nelson Dale,

of the United States Geological Survey. The highest of the range, near the beautiful village of Manchester, where the sidewalks are of marble, the commonest rock thereabouts, is Mount Equinox, 2,816 feet, which probably has nothing to do with the sun crossing the equator, though it was first climbed about the time of the

autumnal equinox, in the year 1823. It is most likely an Indian name, Equanok.

East of Taconic Range are the Green Mountains, beginning with the hills of Connecticut and continuing through Massachusetts, the watershed of the Hoosatic and Connecticut Rivers. On the hill tops of the latter state are the highest towns in New England, Peru, Windsor, Savoy and Florida (all over two thousand feet above the sea), recalling Dr. Johnson's lines:

Let observation
with extensive
view
Survey mankind
from China to
Peru.*

In Vermont there are four of the Green Mountains

over four thousand feet, the highest, Mount Mansfield.

*Massachusetts is not alone in its strange choice of names. Scotland and Lisbon join Canterbury in Connecticut; Berlin and Milan are side by side in northern New Hampshire; while among the hills of Maine, Norway, Paris and Oxford are grouped together, with Denmark, Sweden and Naples nearby, and Limerick in the offing.



A SECTION OF THE PRESIDENTIAL RANGE

This shows Mounts Adams and Madison from Glen Road, in the White Mountain National Forest, New Hampshire.



A PANORAMIC VIEW OF THE PRESIDENTIAL RANGE IN LATE OCTOBER IN THE WHITE MOUNTAINS

This beautiful range, the New England Highlands, culminates in Mount Washington, rising above its peers to a magnificent height of 6,293 feet. Some of the most perfect recreation country in the United States is found here.

4,364 feet, having a little hotel, built in 1858, near the top. The backbone of this mountain is a long, rocky ridge; but most of the mountains, as their name would imply, are covered with evergreen trees to the top. There are twenty-five summits between three thousand and four thousand feet. To connect these various heights the Green Mountain Club was organized in 1910, and soon there will be a forest trail along the entire chain from Massachusetts to Canada, 157 miles air line, which of course the Long Trail, as it is called, does not follow. It is very earthly and very woodsy and will probably be nearly 250 miles long, nor do the mountains stop at the northern border, they keep right on into the Province of Quebec.

The mission of the Green Mountains and of the state that has taken their name is to look pleasant, to cheer. Other states have Black, Blue, White and Ruby mountains, but Vermont stands by her color and invites the pilgrim to climb her green heights or rest by the way

Under the greenwood tree
And tune his merry note
Unto the sweet bird's throat.

In central Massachusetts, east of the Connecticut valley, is another ridge of hills, which after crossing into New Hampshire, sends up a well-known watch tower known as Mt. Monadnock, 3186 feet. This range, in the main low, the watershed between the Connecticut and the Merrimac, continues northward sending up an occasional peak like Mt. Sunapee, the southern Kearsarge and Mt. Cardigan, until half way up the state near the headquarters of the Merrimac it breaks all bounds and increases greatly in height, forming an irregular mass, the White Mountains, roughly forty miles square and spreading out clear across the state. Beyond the White Mountains are still more mountains extending well into Canada, in fact the northern half of New Hampshire has very little level land. Somewhat north of the centre of the White Mountains the New England highlands culminate in Mount Washington, which rises a few hundred feet above its peers to a height of 6293 feet. In the sixty miles from Randolph, at the north of the White Mountains, to the northern point of New Hampshire only two roads cross the state, nor are there many trails. A few have been opened up, namely, on the Pilot Range and Percy



ANOTHER BEAUTIFUL SCENE IN THE ADIRONDACKS

This is Heart Pond and Mount McIntyre from Mount Jo. It is typical forest—mixed hardwoods on the lower levels with balsam fir and red spruce on the margin of the pond. Ideal vacation land, set with jewel-like lakes.

Peaks near the White Mountains, and up some of the mountains around Dixville Notch, forty miles away. Dixville Peak is the highest of the latter group, 3118 feet, but the highest point of the road through the notch, which has some of the wildest rock scenery in New England, is 1990 feet.

From the eastern bounds of the White Mountains detached peaks, interspersed with many beautiful forest-surrounded lakes, continue to the northeastward through the state of Maine, to and across the Canadian border. The highest of these peaks, 160 miles from Mount Washington, Mt. Katahdin, 5273 feet, the most interesting and one of the most inaccessible mountains in New England. "Standing alone without society", taller by nearly a thousand feet than any other peak in the state and exceeded in New England by only half a dozen summits in the Presidential Range of the White Mountains, it is no wonder that it appealed to the solitude absorbing Thoreau and to all lovers of the wilderness before and since. Thoreau's ascent was made in 1846. Among other early climbers who have left interesting accounts are Professor J. W. Bailey of West Point in 1836, Dr. Charles T. Jackson in 1837, Rev. Edward Everett Hale in 1845, Theodore Winthrop in the fifties and Professor Charles H. Hitchcock in 1861. In the early years of the Appalachian Mountain Club, Professor Charles E. Hamlin and the Club's secretary, Rosewell B. Lawrence, did much to make the mountain better known and more accessible. In 1900 a small but notable party from the New England Botanical Club made an exhaustive study of its flora, publishing the results in their journal, *Rhodora*. One of the most interesting ascents was made on snow-shoes in February 1910 by Ralph Lawson and Percival Sayward, and the latter's account, in *Appalachia*, deserves high rank in mountaineering literature.

Although Katahdin is preeminent in its domain there are lots of other mountains in Maine, fifty-eight occupied in summer by fire lookout stations, for Maine's lumber industry is large and valuable, and needs protection. This means that there are at least fifty-eight mountains with good trails and extensive lookouts. A list of them will be found in the reports of the Forest Commissioner of the state. Unfortunately there is no adequate map of Maine, and the reports give no information about trails or altitudes. I doubt if anyone knows which is the second highest mountain in the state. There are several claimants, Speckled in the Border Mountains, Traveler Mountain twenty miles north of Katahdin, Parlin Pond Bald, north of the Dead River region, Saddleback near Phillips, east of Rangeley. These are all a little over four thousand feet probably. There is another Saddleback—called also Bald Pate and Bear River Whitecap—east of Grafton Notch, that may reach the four thousand mark. The first Saddleback with Blue, Abraham and Bigelow, are known as the Kennebec Peaks. Parlin Pond Bald, Baker, 3589 feet, and the mountains around Moosehead Lake are on the Kennebec watershed. Turner Mountain, east of Katahdin, is 3700 feet, and the Sourdnahunk Mountains to the west reach 3500 feet. Of the Boundary Mountains,

between Maine and the Province of Quebec, the highest seems to be Mt. Gosford, 3658 feet. Snow Mountain, a little south of the actual boundary, has a claim for 3800 feet. Deer Mountain, northwest of Gupsuptic Lake, is probably 3500 feet.

Taken all together it will be seen that in the four hundred or more miles between northwestern Connecticut and northern Maine there are many mountains, their dark forested slopes uplifted against the sky to cheer and inspire us. While the prevailing color is green for most of the year, except when distance robes them in an azure hue or sunset turns them momentarily to purple and gold, they have their white season, when they become a challenge to the mountaineer. Only when man becomes reckless do they wear sackcloth and ashes and become unlovely. Let us then preserve them in their virgin beauty.

CARDINAL'S CANE FROM FAMOUS TREE

THE Old Mulberry Tree at St. Mary's, Maryland, is bringing out new facts since it was nominated for a place in the Hall of Fame and its picture published in an earlier issue of AMERICAN FORESTRY. The following was taken from the Baltimore News:

"Cardinal Gibbons had a cane made from the wood of the old mulberry, presented him in the early nineties by General Bradley Tyler Johnson. General Johnson was the author of the "Foundation of Maryland," and some of his most interesting addresses were made before the Catholic Club, opposite the archiepiscopal residence on North Charles Street, now the official home of John Gardner Murray, of the Protestant Episcopal Diocese of Maryland. The president of the club, James R. Wheeler, of the First Maryland Cavalry, Confederate States of America, one of the closest personal friends of the Cardinal, and a number of its members had been soldiers in the Maryland Line under Johnson. The General, who came from Frederick County, was a keen student of early history in Maryland and a zealous defender of the Calverts. About the time the monument to Governor Leonard Calvert was erected at St. Mary's City, General Johnson secured some of the wood of the famous tree, and, after making an address on the old mulberry at the Catholic Club, was escorted by a party of his comrades to the archiepiscopal residence, where at a private reception by the Cardinal a cane made of the tree that is so intimately associated with Catholic Maryland was presented His Eminence for use in his strolls about the city."

THE wonder of the forests, their immensity and variety, their worth are to be considered as an ineffable appeal to conserve and restore and save. Help to perpetuate—talk forestry to your friends and let AMERICAN FORESTRY MAGAZINE show them the way to a better understanding and appreciation of God's great outdoors.

OUR GANNETS—SEA-FOWL OF UNUSUAL INTEREST

BY DR. R. W. SHUFELDT, C. M., Z. S.

(PHOTOGRAPHS BY J. H. GURNEY, F. Z. S., OF ENGLAND, AND THE AUTHOR)

THOSE foresters who have their homes and guard our forests along the Atlantic seaboard, from the coasts of Maine, southward, are often good observers of the oceanic species of birds, including such forms as are generally designated as shore birds; they come to recognize the gulls and the terns, and a big albatross when they see one, the man-o'-war-bird or frigate

pelican, the osprey, and not a few others. Now, I propose to describe here several other species of large sea fowl, which they are sure to see frequently, but with which they may not be so familiar, inasmuch as they do not breed on our coasts, although frequenting them during their migrations. These are the Gannets, which are large birds related to the tropic birds, to the Anhingas, to the Pelicans, to the Cormorants, and to the Man-o'-war bird, and we give the name of Steganopods to this group as a whole, which refers to the

fact that they all have fully webbed feet; hence, too, the vernacular name Totipalmate Swimmers. They are large birds, generally exceeding a couple of feet in length. In appearance and habits they are greatly at variance, although they do have quite a few characters in common besides the complete webs between the toes.

All are maritime forms, and all catch and subsist upon fish. Some of them, as the pelicans and cormorants, have a more or less strong hook at the end of the upper bill, and a bag-like appendage beneath the lower one, which latter character is best marked in the pelican. Their tongues are more or less rudimentary, and this is likewise true of their nostrils, which are absent in the

Gannets. Most of them lay but a single egg, while the Anhingas or Snake birds may lay as many as five, and they nest upon rocky ledges or isolated islets, in rude nests on the ground, or in low shrub-like trees or bushes.

In all instances the young are featherless when hatched, but soon clothed with soft, white down. With respect to their breeding habits, they are all gregarious, nesting in colonies, and, insofar as the Gannets are concerned, in enormous numbers—a fact that will be more fully touched upon further on in this article.



OLD GANNET AND YOUNG ON BASS ROCK

Note the snowy white plumage of the adult bird, and the beautiful soft white down on the young bird with its jet black bill. The baby Gannet emerges from its egg at the end of June usually blind and bald, with small feet, a large head and a mouth of dark, bluish-grey, but in twenty-four hours it has gained strength enough to stretch its wings. On the eighth day its eyes are open and by the ninth it can squall vigorously.

The Gannets are all arrayed in one family, the Sullidae, and that this group contains but one genus, Sula, there being associated in it some six species of Gannets, though only one of these is called the Gannet (Sula bassana). All the rest are known as Boobies—as the Booby, the Blue-faced, the Blue-footed, the Red-footed,

and Brewster's Booby. All these have some of the habits of the species here described.

Gannets are strictly oceanic birds, and are only found inland when they have been driven by storms, or for some reason or other missed their accustomed migratory routes. It is a big bird, as big as a goose; and hence, among a good many other names applied to them throughout history, they have been called Solan Geese, or simply "Solans." They are wonderful on the wing, flying with great rapidity, and plunging down from the air in a most extraordinary manner to seize the fish upon which they prey.

One of the most remarkable facts with respect to these big sea birds is their extraordinary gregariousness. At the breeding season and at other times they congregate in thousands on rocky, isolated islets occurring in their area of distribution, and there they build their seaweed nests in great communities on the ledges, each female laying a single, rather large, chalky white egg, tinged with greenish-blue. On our side of the Atlantic Ocean, the Gannets breed in enormous numbers on Bird Rock and on Bonaventure Island in the Gulf of St. Lawrence, while they breed in similar situations on several of the islets off the British coasts. During the winter these birds are to be found as far south as the Gulf of Mexico, and northward to the coast of North Carolina; while on the other side of the Atlantic they occur in more or less numbers on the Canary Islands, at Madeira, and in the Mediterranean off the African coasts.

So strong is the gregarious instinct in these birds that they are rarely seen singly; and they are truly beautiful creatures upon the wing, or when swimming in numbers on the billows of the ocean. Indeed, the flight of the Gannet has been described and figured by scores of writers since the earliest times in history. For instance,

Doctor Lucas, a modern contributor, says this about it: "The height at which the Gannet flies above the water is proportionate to the depth at which the fish are swimming beneath, and Captain Collins tells me that when fish are swimming near the surface the Gannet flies very low and darts obliquely instead of verti-



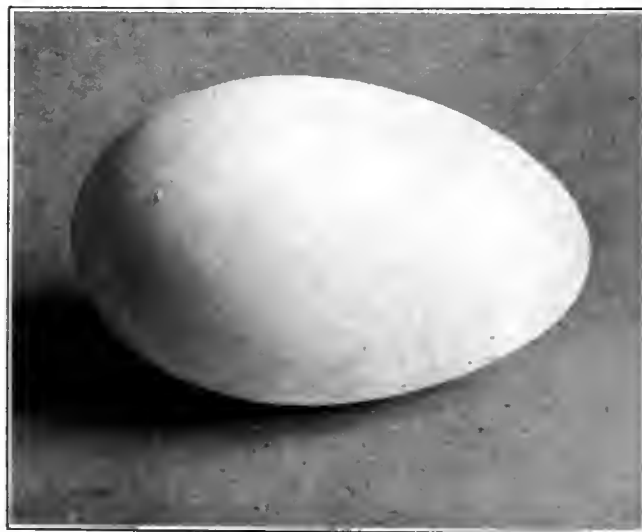
HEAD OF OLD MALE GANNET

Gannets possess wonderful power of vision, but on the other hand their sense of smell and hearing is notably poor. They have no nostrils and their ears are covered with dense feathers. The plumage of the adult bird is white, primaries and coverts black; the bill grayish, tinged with greenish or bluish lores, and the throat sac black. The feet are black with greenish or bluish scales. This bird was once a resident of the famous Bird Rock.

cally upon its prey. Should any finny game be seen within range, down goes the Gannet headlong, the nearly closed wings being used to guide the living arrow in its downward flight. Just above the surface the wings are firmly closed, and a small splash or spray shows where the winged fisher cleaves the water to transfix its prey. Disappearing for a few seconds, the bird reappears,

rests for a moment on the water, long enough to swallow his catch, and then rises in pursuit of other game."

The islets where Gannets have bred throughout history are known as "gannetries;" the birds are extremely tenacious of them, and breed not at all elsewhere. The islet Lundy, off the British coast, has been deserted; others are Wales; Grasholm, on the coast of Pembrokeshire; Ireland: the Bull Rock, the Skellings; Scotland: the Bass Rock, Ailsa Craig, St. Kilda Islands, Sulisgair (or North Barra), the stack of Stack and Skerry. Faero: Myggenaes. Iceland: Sulusker, Eldey, Grimsey. No Gan-



AN EGG OF THE GANNET (*Sula bassana*)

The gannet lays a single, white egg in a nest constructed of seaweed. This egg, when incubated, turns a mottled earth-brown. The white eggs are made so by an overlay of chalky matter, which may be scraped off. Because of their precarious nesting habits, the gannet eggs are quite often broken.

net settlements are now known to exist on the mainland of any country, anywhere. It is strange that in the places enumerated they breed by the thousands—in earlier years by the millions—and not anywhere else. Ages ago these gannetries were leased to corporations, which had the sole right to collect eggs and kill the birds for their patrons, as both were much in demand for the table. These rights were designated as “Inquisitions” or “Ex-

tents,” and some very ancient records of them are on file, especially in England. One of the oldest of these is that of Lundy Island, which is off the north coast of Devonshire, where in former years the gannets bred in enormous numbers.

Off the coast of Ireland both the “Bull” and the “Little Skellig” are occupied by many thousands of gannets, and their precipitous cliffs are simply packed with their nests in the breeding season. From one cause or another, the bird population of any gannetry may be reduced to a very scant number; then, favorable times coming, a recruiting takes place,

and the number of gannets again mount up into the thousands. At present there appear to be some 16,000 gannets on Skellig and only 500 on the Bull. Ailsa Craig, in the Firth of Clyde, Scotland, is, next to Bass Rock, the most accessible breeding place of these fowls.

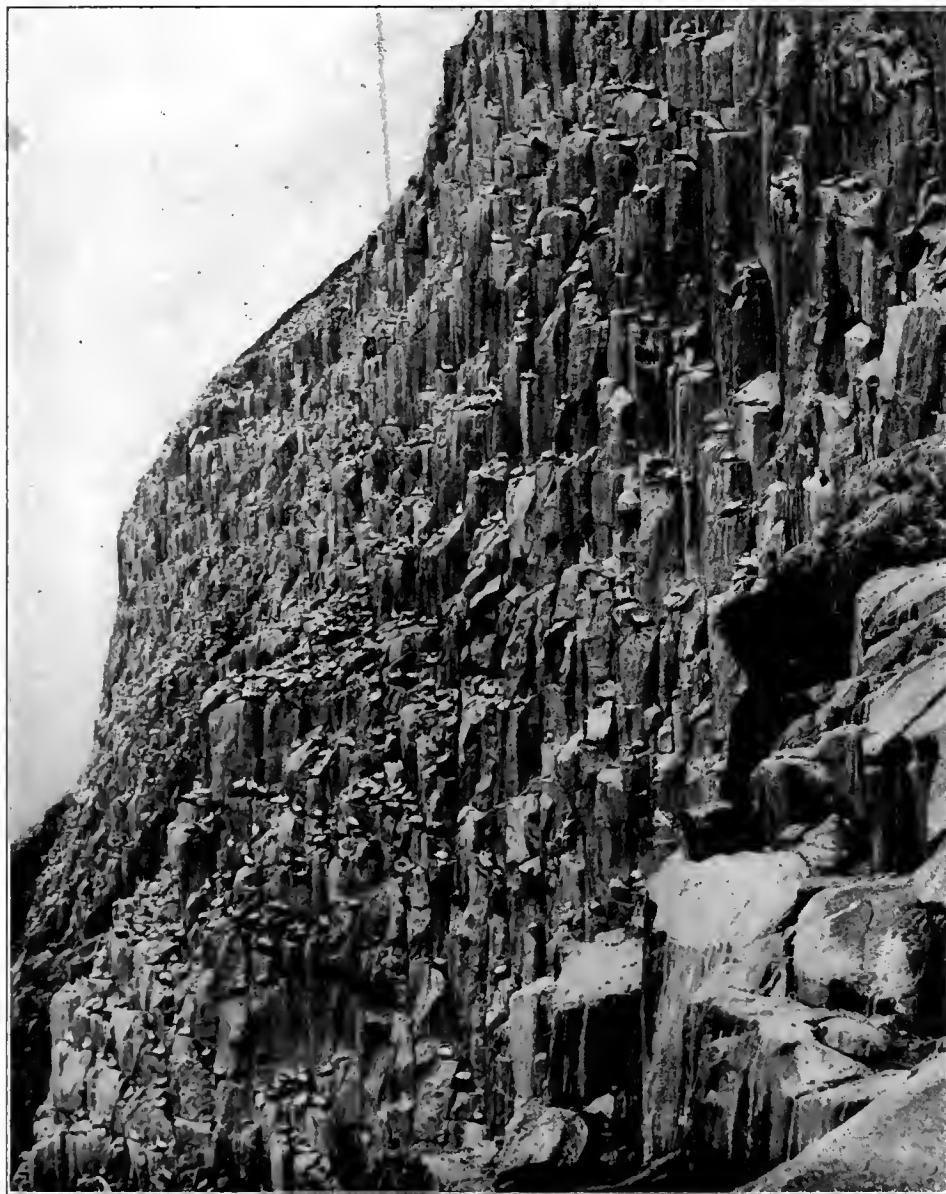
The history of the gannets on Ailsa Craig is a long and very interesting one. In the old days, when the “fowl-

ers” used to gather up the gannets on the Craig, they killed them by a blow on the neck with a billhook or with a cudgel; some, perchance, were knocked into the sea and got away. A few of these have been found by naturalists; and Dr. R. O. Cunningham has evidently examined the healed or partially healed injuries of some of them, reporting the fact that gannets make most remarkable recoveries from such wounds, especially in the

matter of the reuniting of fractures of the bones.

Mr. Gurney has visited Ailsa Craig in person, and in his book he has given us the most wonderful account of it; he gives as a present estimate that the bird colony there averages a population of some 6,000 individuals. Another writer gives it 30,000; but we must believe that he is very wide of the mark.

To pass on to our own side of the Atlantic, we have the gannet-rocks on the coast of Canada, which latter have been visited by a number of American ornithologists. Upon the whole our treatment of the gannets will be found



THE GANNETRY OF AILSA CRAIG

Ailsa Craig is one of the great breeding places of the gannet; it is situated off the coast of Ayrshire, in the Firth of Clyde, Scotland. The view here is of the West Cliff. This famous rock is about nine miles off the coast, and rises 1,114 feet above the sea-level; it is composed of columnar syenite, like the columns of the celebrated Giant's Causeway, and it is atop of the broken-off columns that the gannets build their nests.

to be a sad story and an object lesson in the matter of conservation; for, as we have wasted thousands upon thousands of acres of the timber constituting our forests, so we have, at different times, wiped off the face of the earth millions upon millions of our birds—the most beautiful of all living forms inhabiting this planet. However, there is this wonderful difference—forests can be



THE GANNET IN IMMATURE PLUMAGE

This young gannet has the livery of the species when it has attained the age of about five months. The plumage of the young bird is dark brown with a tinge of olive, spotted or streaked everywhere with white. On the head and neck the spots tend to form streaks. On the back and wing coverts they are triangular, usually one on the end of each feather. The primaries and tail are dusky. It requires three years for the bird to attain perfect plumage.

planted and restored, while no legislation known to man can ever restore any species of bird after it is once utterly exterminated. Our Wild Pigeon is gone—and gone forever, and other forms are rapidly following it. Ages ago, the Great Auk and the Gannets flourished in hundreds of thousands on the rocky islets and islands of the mouth of the St. Lawrence River on the eastern coasts of Canada, or on Gannet Island to the north of it. As is well known, the Great Auk was a big, heavy bird—flightless, but a good swimmer. Then, off those coasts came the fishermen with their boats, and it was soon found that these Great Auks made good fishing bait “off the Banks.” So they went ashore; and for this and other purposes, these fishermen slew the Auks by the thousands. Their last stand was on Funk Island, the largest of all the islands mentioned; and there, before the middle of the last century, the last of all the Great Auks in the world was exterminated.

Next, these fishermen and their descendants got after the gannets, which they likewise used for bait; probably they

ate up all the fish in the sea off the coasts of southern Australia. The timely efforts of the distinguished explorer of the Commonwealth, Captain S. A. White, averted that disaster.

The first mention of these North American gannets was made by Jacques Cartier in 1534, who said, “we reached land on the seventh of July, landing at Bird



AN ADULT GANNET ON ITS NEST

This view was taken on Bass Rock, one of the wonderful “gannetries” of history; it is at the entrance to the Firth of Forth, Scotland, quite close to the shore on the southern side, and not so many miles from Edinburgh,

used these also for food as they did their eggs. Gannets then bred in hundreds of thousands on five different islands and at one point on the coast, namely on Gannet Rocks. Besides the two mentioned above, these islands were Perroquet, Bonaventure, and Bird Rocks, and here, in due time, utter extermination seemed to be their fate, when fate determined otherwise and it was averted. Now they breed by the thousand on but two of these islands—Bird Rocks and the Island of Bonaventure, and, at this writing, gannets seem to be increasing in numbers every season, which is fortunate, as these breeding sites constitute one of the most picturesque features of those coasts; and as to the gannet exterminating the fishes in those waters—that is clear moonshine, belonging in the same class of myth as that of the cormorants

Island, which is fourteen leagues from the mainland; this abounds with birds, so much so that all the ships of France could load up with them without any apparent diminution. Here we secured two boat-loads full for food."

In June, 1833, Audubon saw these Rocks from the deck of the Ripley, and since his day they have been visited by a number of American naturalists and ornithologists, who have given us most interesting accounts with photographic and other illustrations of them.

So much, then, for the accounts of our explorers, none of whom found the gannets anything like as numerous at their various breeding sites, as in the days of Jacques Cartier and the early explorers.

The Gannet lays a single, white egg in a nest constructed of seaweed; this egg, when incubated, turns a mottled earth brown, and has been so figured by Mr. Gurney. The white eggs are made so by an overlay of chalky matter,

which may be scraped off. They get very dirty before they are hatched, and not a few are broken in one way or another. At their precipitous, rocky places of breeding, every available ledgelet may have a nest upon it, the sight being, as a whole, one to be marveled at

as belonging in the list of the world's wonders. Nearly all large gregarious birds lay but a single egg to the clutch, and when we find two in the same nest, the second one was doubtless laid by another individual.

Gurney says: "Under normal conditions a nestling Gannet emerges from its egg at the end of June, blind and bald, with small feet, a large head, and a mouth of dark bluish-grey, and, in twenty-four hours it has gained strength enough to stretch its wings; on the eighth day its eyes are open, and by the ninth it can squall vigorously." The feeding of the nestlings by the old ones makes another very interesting chapter in their life histories.

Many facts in the lives of gannets, as well as in the lives of other large marine birds, are entirely unknown to the general public. When the time comes for the young birds to look out for themselves, some remarkable developments take place. "The flight, or rather descent

of the young Gannet from its natal ledge is a very unsteady performance," says Mr. Gurney; "yet on the whole it is well sustained, so that the bird has probably achieved a distance of half a mile before the final descending curve into the sea takes place, which ends with a mighty splash, caused by the impact with the water. * * * When once launched, the young Gannet is comparatively safe, except that it is now in some measure at the mercy of the tide. In the sea it remains, drifting hither and thither for a space of two or three weeks. It is apparently unable to rise from the water, and all evidence points to its receiving no food whatever, except the sustenance contained in its own subcutaneous layer of grease, which is considerable, enough to impart nutriment to the rest of the body."

Calculations have been carefully made that go to show that when an egg of a gannet is hatched on the first of July, the young bird does not begin fishing until the 25th of the following September. Young albatrosses are so laden with their own fat that one of them may go five months without taking any nourishment; this is likewise true of young penguins and of other sea fowl.

Adult gannets exhibit great affection for each other and for their

young. Jealousy is another of their traits, as is their short-lived combativeness, when their nests on the precipitous ledges crowd each other during the breeding season.

Gannets possess wonderful power of vision, but upon the other hand their sense of smell and hearing is notably poor; they have no nostrils, and their ears are covered with dense feathers.

These birds subsist upon quite a variety of marine fishes, ranging in length all the way from sardines to big herrings, which they capture by plunging for them from the air and scooping them up with their mandibles while swimming on the sea, where these fish occur in numbers near the surface.

In addition to their normal mortality, gannets are destroyed in many ways; but all that side of their history must be omitted here for lack of space, together with many other interesting facts regarding them.



TWO YEAR OLD GANNET

At this age the plumage has nearly assumed the colors of the adult bird. These birds subsist upon quite a variety of marine fishes, ranging in length all the way from sardines to big herrings, which they capture by plunging for them from the air to the sea, where their victims are innocently swimming near the surface.

STATE FORESTERS STUDY BLISTER RUST DAMAGE

CONTROL of the white pine blister rust was the principal subject considered at the annual meeting of the Association of State Foresters, held in New York State on September 20-22. Representatives of the Forestry Departments of sixteen states, the Province of Quebec and the United States Department of Agriculture were present. A trip of 80 miles through the splendid white pine forests of the eastern Adirondacks occupied the first two days. The third day was devoted to a study of top lopping and other methods of fire protection in the Adirondack Preserve.

The members of the Association motored from Albany to Chestertown, New York, on the first day. A stop was made at the State Forest Nursery at Saratoga, which contains over 1400 seed beds and 18 million trees.

Observations were made of conditions on a large estate at Lake George, where, in 1917, blister rust was found established on ten acres of white pine. Trees 50 feet in height are now dying as a result of blister rust infection that occurred prior to 1918. Numerous dead and dying pines of smaller size furnished convincing evidence of the destructive powers of current and gooseberry bushes when infected with

the rust. The wild and cultivated currants and gooseberries on and adjacent to the tract were uprooted in 1918; and as a result, the foresters were unable to find any recent blister rust infection on the pines except in one small area, where a few wild gooseberry bushes had been overlooked in 1918. Adjacent to these bushes the pines show numerous blister rust cankers of 1918 and 1919 origin. Cankers caused by infection in 1920 and 1921 are not yet visible, since it takes three years after infection for the blister rust swellings to develop on pine.

Several hours were spent at Horicon, New York, in observing the severity of damage in a typical old pasture lot growing up to white pine. Some of the trees are 30 feet high, but most of them are under 15 feet. Large,

wild gooseberry bushes are scattered among the pines. Infection first occurred about 1913, and now over 80 per cent of the pines are dead or dying from blister rust cankers on their stems.

Most of the trees large enough to produce seed have numerous cankers on branches and trunks, and are doomed to ultimate death. Small seedlings on this area are conspicuous by their absence, and those present are practically all diseased. One tree three inches high had two stem infections, and on a three-foot pine nearby 28 rust cankers were counted. A tree ten feet in height had 48 cankers of such recent origin (1918 and 1919), that the foliage was still entirely healthy in appearance. This tree was pointed out as an example of the deceptive nature of the rust. The pine tops remain green several years after their trunks are girdled. The real damage is done long before the tree finally succumbs.

Several years ago this stand could have been saved by uprooting the gooseberry bushes within 200 yards of the pines, at a cost of 75 cents to \$1.00 per acre for hired labor, or less if the owner had done the work in spare time. The foresters were shown an area near Horicon where the wild gooseberries and skunk currants were de-

stroyed in 1918. A check made in August, 1921, showed that there were 155 white pines under 20 feet high on a quarter-acre plot, of which 45 were infected with blister rust. The entire absence of cankers on the wood of 1918 and 1919 growth attests the effectiveness of the control work.

The second day the party traveled 50 miles through the heart of the white pine region of the State. Pines with blister rust "flags" (branches killed by the rust) were observed everywhere along the route. At one point a white pine plantation made in 1915 already had half of the trees infected, due to the presence of a few wild gooseberry bushes in and around it. At North Hudson wild gooseberries were observed to be numerous and

(Continued on page 794)



FORESTERS IN ATTENDANCE

Some of the foresters at the recent meeting of the Association of State Foresters, photographed after the luncheon at the State Blister Rust Camp at North Hudson, New York.

HONOR ROLL MASONS OF PENNSYLVANIA

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 to the Association.

Charles S. Miller (9), Daniel S. Keller (43), Lester L. Rohe (45), Emeal M. Semmelrock, Jr. (45), Emanuel R. Wilson (51), Charles S. Hinchman (52), Wilbur B. Small (59), Charles O. Rose (59), William G. Davies (61), Harry Lyons Greenwood (67), Ernest Z. Stead (67), Harry Timothy Mara (67), Howard A. DeLaney (70), Frank Raymond Bower (70), Ransom Bardwell Grumme (70), John K. Bender (72), William Ray Hartman (106), Walter E. Smith (114), Maurice Chasin (114), Joseph Lewis (115), S. Harold Boyd (135), Conrad Walter Ziegler (155), Leonard S. Persichetti (155), Joseph R. Milligan (158), Howard W. Kahler (163), Brewster Cameron Schoch (194), Samuel Musser Rine (194), John Z. Steese (197), Earl W. F. Childs (203), Charles E. Huzzard (211), Charles G. Murphy (211), William L. Shattuck (218), F. Ivan Knorr (218), Andrew E. Morrison (218), Benjamin Moore (223), John S. Winner (224), George Rupp Pretz (226), Herbert Moore Harbach (226), Stanley Kline Smith (227), William Schwind (230), Frank E. Seifert (230), Harry C. Hill (233), Benjamin F. Havard (233), Alfred Stevenson (236), Howard H. Raabe (238), Harold E. Warner (240), Perry Stevenson Gaston (243), Frederick David Clare (246), Grover Goodall (250), Charles H. Boisseau (252), Harry W. Miller (249), Chester A. Patterson (249), Hubbard H. Bahr (254), Arnold Huber (254), William G. Ruth (254), Harry L. Stevens (254), Wallace W. Fetzer (256), George O. Keiser (256), George E. Phillips (261), Lester W. Johnston (262), E. Clare Rebert (266), Frederic Charles Dose (268), Elmer Charles Miller (269), Edward Krauss (271), Robert John Patterson (272), Carl Anthony Fenner (273), Elliot C. Weller (273), Emlen F. Hawthorne (274), Thomas B. Anderson (275), Robert E. L. Barlett (277), William Fred Caldwell (278), Gilbert Doolittle (278), Raymond W. Bodder (283), Howard Lee Strobl (283), John Dorrington (287), William S. Kast (287), Clyde A. Trotter (287), Robert H. C. E. Black (289), William D. Geizer (289), Gilbert M. Newburger (289), Frank O. Amon (290), Theodore G. Scholler (292), Richard Burton, Jr. (292), William T. Shetzline (295), David G. Cooke (296), Thomas C. Allen (298), Roland H. Ritter (299), Clair Logan Hicks (300), Frederic Barradaile Pritchett (303), Homer R. Austin (306), Oscar M. Hykes (315), W. Earle Champaign, Jr. (317), John S. Baldwin (322), John H. Ballamy (332), Thomas Jenkins, Jr. (337), John Franklin Downer (337), Archie L. Tanner (338), C. Justus Criswell (343), Walter Gustav Horak (345), Harold Haines Bair (348),

Homer William Robinson (348), Homer E. Dennis (350), Ernest Angell (351), William Pierson Derickson (352), Darius Brown Whitesell (354), Antes S. Lintner (355), Samuel S. Crouse (358), Raymond V. Martin (361), Franklin B. Trosh (363), Lester I. Kistler (363), Charles B. Case (365), Stanley J. Platt (372), Kenneth Brown Hay (379), John Garner Wilson (379), Michael Jaffe (383), Joseph F. Bellak (384), John B. R. Bennett (385), George C. Kamerer (385), Elmer Z. Kinsey (385), Edwin S. Ledlie (385), Albert M. Muellerschoen (385), Merle C. Reed (391), Richard Karl Reznor (392), William A. McCollough (396), Torrence H. Deise (397), Ellis Lewis Griffith (400), Clyde F. Mowrer (401), Orville S. Kidwell (402), Thomas Reed Ferguson (417), Joseph G. Brickley (419), William A. Freihofner (419), John Binns, (420), Alfred Y. Hendricks (420), Ralph Hubert Fickes (431), Frank Dolan (432), Charles Raymond Ewing (437), Lyman G. Saunders (445), John McC. Marshall (448), Charles N. Patterson (448), David J. Norris (449), John E. Lillich (451), Charles E. Kohr (451), George Howard Ott (453), Clarence

Huth (508), William Crawford Cole (508), Marshall Hughes, Jr. (511), Frederick H. Keithan (511), Samuel M. Shelly (512), Clyde E. Lutes (513), Ralph G. White (515), LeRoy Barber Boyd (517), Francis M. Miller (520), Walter Watson Craig (522), James McKenzie Henderson (522), Charles R. MacLeod (522), Thomas W. Astbury, Jr. (528), Lindsey Cochran Whiteside (529), Joseph Lewis Lang (530), David M. E. Griffith (541), Charles L. Clark (543), Joseph T. MacClurg (543), Clarence C. Kahle (546), Alfred T. Morrison (547), John T. Reed (548), James O. Newpher, (551), Howard Dimon Mastin (556), Gus Evans Warden (557), Willis B. Duddle (557), Charles E. Egge (561), Howard C. Braddock (562), Clarence M. Mack (568), Jesse Gilbert Knecht (570), Paul J. Simison (575), Edmund W. Lynch (578), James W. McMeekin (578), Theodore G. Robinson (578), Wallace Craig Dickson (581), Norman Beadle Hallman (581), David Burton Foster (583), Harris D. Buckwalter (585), Joseph H. Stoner (586), Charles M. Rawlings (588), Daniel Burley (589), Jacob Edwin Deal (589), John M. Clarke (590),

Walter M. Godshall (596), Earl S. Crouthamel (596), David Clair Vosler (599), Harold Baker Merz (600), S. James Keister (601), Joseph S. Edwards (606), George B. Kolp (606), Harry J. Newkumet (606), Harvey W. Leidy (609), William L. Boshysshell (610), Harry B. Rodes (610), Corwin B. Taylor (610), William F. Guilfoyle (610), William Cecil Short (610), Charles V. Lemons, Jr. (618), Robert C. Waldo (618), Wayne R. Horton (618), Henry C. Welker (620), Charles D. Linderman (620), Norman C. Sherer (621), William F. Butler (626), Russell Cisney Parson (630), Mark H. Hasana (634), Elmer

C. La Buhn (634), Howard A. Buente (635), Robert F. Downie (635), Ross George Kiechel (637), Owen Frederick Jones (640), William H. Keenan (642), C. Bruce Brenizer (646), Paul S. McSparran (646), Albert H. Gaumer (646), Dunning Hart Ross (647), Charles W. Crede (647), Orville Ross Thompson (650), Walter C. Graham (650), Eugene F. Baldwin (653), Frank R. Kirk (653), Thomas G. Thompson (657), Zo David Stauffer (662), Gustaf Lewis Norstedt (670), Thornton O. Williams (672), M. Wilson Keith (674), Crandville Le Moyné Sargeant (674), William Thomas Davis (677), Earle R. Marvin (679), George Edward Daugherty (683), Ellsworth K. Davies (685).



"MEMORIAL GROVE"

Showing the memorial trees planted on the Masonic Home's property of the Grand Lodge of Pennsylvania at Elizabethtown, which have been registered with the Association by the Hon. George B. Orlady, of Philadelphia. There are 264 trees and in the list the Honor Roll gives the lodge number after each name. There were 11,323 Masons in the service of their country in the World War. A memorial volume has been issued with a foreword signed by John S. Snell, Grand Master, and John A. Perry, Grand Secretary.

A. Goehmann (455), John Reeves Graham (457), Rupert C. Spencer (462), Benjamin F. Ludwig (462), Robert A. Boll (464), Francis E. Zeigler (464), George E. Snyder (465), William B. Hake (465), William E. Patten (466), John Flock Hauser (467), Austin W. Frankenfield (469), Ira M. Weikel (475), Clinton H. Garrett (475), Norman T. Scarlett (475), Gerald G. Griffin (477), William Manlove Hickman (481), Lester B. Rothschild (482), Thomas Brainerd Coburn (484), Elbert Shultis (484), William L. Sanderson (490), Charles G. Baird (491), Raymond J. Cubler (493), Horace F. Critchley (495), Albert J. West (499), Howell W. Williams (499), Samuel S. Wheaton (500), George W. H. Conrad (500), Thomas B. Patton (500), Charles C. Anderson (506), George H. Bauer (506), George R. Schumacher (506), Albert A

THE STATE'S RESPONSIBILITY IN A FOREST PROGRAM

BY J. W. TOUMEY

DEAN, SCHOOL OF FORESTRY, YALE UNIVERSITY

IT IS now nearly two years since Mr. Graves, then at the head of the U. S. Forest Service, in a series of addresses throughout the country, initiated the discussion on forest policy which has since been almost constantly before the public. This discussion on natural and state forest policy and the wide spread publicity which followed have been of far-reaching importance to American forestry. Not only foresters but the timber consuming public appreciate more fully than heretofore that the present situation presents a most discouraging outlook for future timber supplies and for permanency in land utilization without a radical change in our forest policy. We are beginning to realize that provision for a continuous and sufficient supply of timber, carrying with it the bringing of permanent populations on nearly a third of our land area is a great, far-reaching social and economic problem which must be worked out by the present generation. This realization emphasized by the discussion and publicity of the past two years has caused two bills to be introduced in Congress, namely the Snell Bill and the Capper Bill. Both of these bills have the same object in view. The purpose of each is to provide adequate machinery to insure a continuous and sufficient future supply of timber for the needs of the nation. Each proposes, but by different methods, the management of private as well as public forests so as to secure the renewal of the forest crop. Both bills recognize that our future timber supply is threatened and that present wasteful methods of logging and neglect of cut over forest land must cease.

I take it, that the underlying reasoning back of the origin of both bills rests essentially in our land problem: in the appreciation that a sane and healthy national life rests more largely in the full and best utilization of the land than in all else combined; in the appreciation that the greatest gift that present society can bestow upon future generations is a land policy established in law that insures a permanent supply of raw materials that grow out of the soil.

The depletion of our forest resources has come through our failure, while using the reserves in our virgin forests, in not producing more timber through growth on areas that have been cut over in the past and on areas where the old growth has been destroyed by fire. The checking of this depletion and the building up of an adequate forest capital for our future needs rests in stopping devastation in future lumbering operations that regrowth may be rapidly attained and in the reforestation of present denuded and partially stocked areas.

To what extent will one or the other of the two bills now before Congress, if enacted into law, promote regrowth and reforestation?

The Capper Bill by giving direct power to the Secretary of Agriculture to control the methods of lumbering throughout the country, irrespective of state authority,

would if adequately executed, stop forest devastation as we now know it and promote regrowth following lumbering operation. This bill, however, would be almost negligible in promoting reforestation or the bringing of lumber crops again on the vast areas now denuded or only partially stocked with mostly inferior species but which, in the future, must again produce a considerable part of our timber requirements.

In my judgment the bill is inadequate, in that it provides for regrowth *only after future timbering*. The public and the states are generally opposed to national regulatory laws governing private forests so long as there is reasonable hope that effective results can be attained through state action. Unless, however, the states awaken to their great responsibility in checking destructive lumbering within their own borders and in the reforestation of the vast areas rendered idle and waste by past practices, the nation will be forced into legislation even more sweeping than that embodied in the present Capper bill.

What we do with the remnant of existing stands, how conservatively we log them, how successful we are in attaining regrowth after fellings will not give us for all time an annual output of wood as great as our present consumption. The great importance of our 137 million acres of virgin growth that remain uncut and on which three-fourths of our commercial timber now stands is to tide the nation over the next thirty to fifty years while we are organizing, stocking and developing those vaster areas that destructive lumbering and uncontrolled fires have so injured and destroyed that they are now producing in annual growth but a mere fraction of their possible yield and that mostly of very inferior kinds and quality.

Although there is no inherent reason why we cannot produce through growth as much wood annually as we now consume, it can not be done without a far-reaching, constructive forest program liberally supported by the public.

No nation has yet accomplished the task that we face through private initiative and enterprise. No country has been able to place forestry on a sound basis without laws which regulate operations on private forests except in those cases where there is a large public ownership of forest property. With four fifths of American forests privately owned some form of public control of operations on private forests appears essential.

Forest crops are long time, low interest bearing investments. They do not appeal to the private land owner. We cannot expect that the reforestation and protection of all classes of forest property now privately owned will or can be assumed by the owners. Yet, if we carry through a policy of reforestation and protection at all

adequate to meet our needs, somehow and in some way, they must be forthcoming.

It is my judgment that the only course that will make for regrowth on an adequate scale is an appreciation on the part of the public that sustained yield even in privately owned forests is its concern and not wholly that of the private owner, and a willingness on its part to work out and put into operation a workable plan of cooperation under which reforestation and protection on privately owned forest land is a burden to be assumed by both the public and the private owner but with the public exacting the requirements essential to attain the object in view.

If the public is to secure the benefits flowing from the wise use of privately owned forest lands it must offer its cooperation and assistance to the extent of making it economically practical to the private owner.

As the growing of lumber cannot be left to private initiative, authority imposed on the private owner of forest property in order to attain the regrowth essential for the perpetuation of our forest industries must come through the nation or state. Mandatory laws, however, imposed by either the nation or state, which place financial burdens on the private owners of forest property would be ineffectual in my judgment in attaining the object desired. Our economic structure is built on the inviolability of private property and just compensation when such property is restricted in its use in order that the public may benefit. *If mandatory regulations are imposed on privately owned forests in order that the public may benefit and at a financial loss to the owner, it is reasonable to ask the public to pay for the benefit received to the extent of this financial loss.*

Although I see the danger in mandatory laws regulating the management of privately owned forests if unwisely applied, I see nothing but great good in such laws if wisely applied. Mandatory regulation is essential in any adequate forest program but such regulation must rest on public assistance and cooperation.

Generous public aid must be available to the private owner in controlling the fire hazard attendant in growing an inflammable crop which takes a generation or longer to mature. Public aid must be available in the adjustment of taxation in harmony with the nature of forest crops. Public aid must be available in attaining regrowth by modern silvicultural methods. *In short, the public must make it economically practical for the private owner to grow fully stocked stands of timber and not attempt to coerce him in growing them at a financial loss.*

The Snell bill emphasizes the cooperative principle and the need for public assistance in establishing forestry on privately owned timberlands. This bill as it is now drawn does not recognize the mandatory principle as applicable to privately owned timberland. It recognizes, however, that the nation, the state and lesser governmental units must work together in attaining regrowth. It is a good bill in many respects but in my judgment has one serious defect. *It does not recognize the fundamental necessity for public regulation of operations on privately owned forest property.* In providing for cooperation and general financial assistance to private forest owners through the several states it does not provide that *the states before benefiting by its provisions shall first pass regulatory state laws covering the important forest districts within the state.*

In my judgment it is the function of the state to determine the essential requirements for regrowth, to work out the cooperation plan with the national government and determine just compensation to private owners by the public in the form of tax adjustment, fire prevention and control, planting stock at cost and other assistance in state-wide reforestation and improvement of cut-over lands. When the public is willing to do its part, state mandatory laws essential for regrowth adequate for our future needs, will meet little opposition and on the whole they will be effectively carried out.

A PICTURE "PAINTED" WITH WOOD

BY HARRIS SAMONISKY

JOHN T. PERKINS, of Wilmington, Delaware, has completed one of the most unique pictures in the United States, in which he used 37 varieties of wood, collected over a period of nearly forty years, with not a single drop of paint used in the entire "photograph." The wonderful work of art is 22 inches by 24 inches and required about six months of steady work for its completion.

The picture, called, "Pals," represents a scene of boyhood days, with the many kinds of wood inlaid to represent the scene. All coloring and variations of effect are produced by the natural color of the various woods. The picture consists of wood entirely, with a coat of shellac over the surface. The principal figures in the picture are the "Pals," a barefoot boy with worm can and fishing pole and his dog looking up with an expression of inquiry.

The boy is about to cross a brook, while behind is a landscape with roads and trees, sky and clouds.

The idea came to the unusual artist, a skilled woodworker, while he was on a trip to Washington last year, when he saw a wonderful work of sculpture. He thought then that if a sculptor could accomplish such results with stone, he should do as well with wood. Upon his return he started to work on his picture with different bits of vari-colored wood he had been collecting since 1882. The work is now on exhibition at the home of the artist.

While no photograph can do full justice to the picture, owing to the many hues of wood contained and the various shadings, the representation given here will convey some general idea of the work. The thirty-seven different kinds of wood used are: African mahogany, amaranth,

amboyna, American poplar, American white-oak, balsam, bird's-eye maple, black ebony, black walnut, boxwood, cherry, Circassian walnut, curly birch, East Indian mahogany, English oak, freak ebony, French beryl, Georgia pine knots, Georgia heart pine, hazel, Honduras maple, Hungarian beryl, laurel from Lookout Mountain, Tennessee, palmetto of Venezuela, petrified hickory, red gum, rosewood, San Domingo mahogany, satinwood, tulip, vermilion of Asia, white holly, wild coffee of Isle of Jamaica, white mahogany, Zanzibar blue, thorn and Bahama mahogany.

A minute inspection of the picture shows many interesting details. All the lines, shadows, shadings, and coloring of every kind, is secured by carefully selected wood. Taking the figure of the boy first,—the hat is formed of satinwood, hazel and white holly; the hair of African mahogany; eyes, white holly, French beryl and black ebony; eyelids, eyebrows and shade lines, hazel; nostrils and

interior of ears, red gum; lips, tulip; teeth, white holly; line forming chin, rosewood; face, white holly; jumper or shirt, Hungarian beryl and ash; buttons, end-grain of boxwood; tear on right shoulder, ebony; interior of arm-hole, sleeve bottom, dark beryl; undershirt sleeve at right wrist, white holly; hand and worm can, white holly; shading of worm can, dark birch; overalls, curly birch; suspenders, mahogany; buttons, black ebony; patch, maple, beryl, white holly, vermilion; parting lines to form two legs, ebony; feet and toes, white holly and ebony; fishing rod, thorn with light tulip in end; fishing line, Honduras maple; fishing float, light tulip and Honduras; fishing hook, cut in with ebony dust; fishing stick in float, rosewood.

In the dog, the nose and all shading, including mouth are of ebony; eye of boxwood and balsam; body, legs and tail, beryl, Circassian, ebony. The path or footing for boy and dog is natural freak ebony; stump at dog's



THE WOODEN PAINTING

Wood in natural colors was the only paint used by the artist in making this picture—and it took thirty-seven varieties.

left hind foot, Circassian, pine knot; stumps at bottom, amaranth, ebony, Georgia knots; title plate, "Pals," petrified hickory, ebony, thorn; to left of stumps, amboyna; bird, Zanzibar blue, thorn, ebony, red gum, tulip; flower bud, palmetto, and grain; leaves, wild coffee, laurel, thorn, satin and balsam. The bottom and sides of the boat are of tulip; ribs, thorn; seat, rosewood; gunwale, white holly, ebony and thorn; thwart, Bahama mahogany and rosewood; oars, red gum.

The cat-tails are of amaranth and poplar; bird's-eye maple at each side of boy, also Hungarian. Directly above boat are rocks in the water, shadowed from timber above. The lower right-hand corner is of English oak, then above, twin stumps of Circassian and pine knots; vine of bird's-eye, pine heart and light tulip; purple boulder is amaranth, a very hard wood; above that is Circassian,

amboyna and a very handsome specimen of the lights of the Asiatic vermilion.

The boulder behind the dog is Circassian, lined with rosewood. The stump is of the same family, with main body of the mahogany of East Indies. The tree beyond is of curly birch; leaves, of vermilion and Hungarian ash family; road is rosewood below, curly birch above; house, white holly, rosewood; chimney, vermilion; water beyond, of hazel family.

In addition to the work done on the picture, the artist has completed a large amount of hand-made furniture of carefully selected woods. His home is a veritable treasure trove of unique articles ranging from inlaid record cases to carved chairs. His hobbies are music and art. In early life he did much work with the artist's brush, which accounts for the wonderful harmony of colors in the "wooden painting," as he calls his work of art.

A TYPICAL STAND OF WHITE PINE IN NEW ENGLAND

NOTE the dense stand of young growth seeded from the older trees in the rear. White pine is one of the most valuable timber trees, and is adapted to a wide range of soils. It is usually found on sandy or light soils, but will thrive on any land that is well drained. White pine plantings are a safe investment if currant and gooseberry bushes are first destroyed within 200 to 300 yards. The cost of protection from the blister rust may be reduced by selecting planting sites as far

and labor of planting, was \$35. The timber today is worth on the stump something over \$1,500."

"The farmer had this strip of practically worthless side-hill, and with some spare time on hand dug up 1,400 seedling pines growing in a thicket and set them out. About 20 years later the farmer died and among his assets was this small tract of young pine for which, much to her surprise, the widow was offered \$300. The second owner retained it for about 15 years and then,



WHAT WAS FORMERLY WORTHLESS SIDE HILL.—PLANTED TO WHITE PINE AND TRANSFORMED INTO A BEAUTIFUL STRIP OF VALUABLE TIMBER

removed from cultivated currants and gooseberries as possible, and where the wild bushes are naturally few or absent. The following example of profit in growing white pine is given in Farmers' Bulletin 1117 of the United States Department of Agriculture: "An abandoned, side-hill pasture of about three acres in New Hampshire was planted to white pine 44 years ago. It now contains about 90,000 board feet of lumber. The total outlay at the time, counting the value of the land

wishing some money, sold it. Soon afterwards it came into the hands of the present owners, a lumber company, for something over \$1,000.

"Assuming a land value of \$5 per acre, and a charge for taxes and oversight for the period averaging \$2 per acre per year, the operation has yielded a return of 5 per cent on the total investment in land, labor, and annual outlay, and in addition a neat sum equivalent to a yearly net profit from the start of over \$5 per acre."

FOREST WASTE IS AN INDICTMENT--

CONTINUED DEMANDS for action on a national forest policy are found in the editorial comment of the newspapers of the country, all of which are rendering fine co-operation in the campaign of the *American Forestry Association*. Some of this comment follows:

Birmingham Age Herald: The *American Forestry Magazine*, which is making a great fight for the preservation of America's timber resources, publishes an article showing by a series of striking comparisons the appalling waste that goes on every day in this country. The protection and conservation of the forests cannot be too strongly urged on state and national legislatures. Few people realize what it means to the future of this country, timber being one of the most indispensable products nature gives to mankind.

Rochester Democrat-Chronicler: Doing is what counts. The only way we can ever get the forestry situation in the United States back where it belongs is to get busy and do the things needful. There was a conference of the Society for the Protection of New Hampshire Forests. President Charles Lathrop Pack, of the *American Forestry Association*, wrote the governors of northeastern states. In the course of his letter, Mr. Pack stated some facts that are more eloquent than rounded periods of argument. Connecticut spends \$3,000,000 a year on freight on forest products she should be producing almost at her factory gates. There are 81,000,000 acres of idle land in the East and Middle West that ought to be growing trees. Three-fifths of our original timber is gone, and half of that which is left is west of the Rocky mountains. What this means in freight rates is not difficult of comprehension.

This is just an item or two from the bill of indictment of the American public as a result of its criminal waste of natural resources with no provisions for repairing the waste. The whole bill constitutes one of the most humiliating arraignments ever made of a nation.

The facts have been presented. The timber is disappearing. The cost is mounting. It is already almost prohibitive. And nothing adequate is done. Will we con-

tinue the policy of "letting George do it" until too late?

Pulp and Paper Magazine: A clarion call for action on the forestry question has been issued by the *American Forestry Association*. It urges upon publishers the necessity for taking immediate steps for the replenishing of forest crops to furnish future pulp material.

Springfield (Mass.) Republican: The *American Forestry Association* urges that

than 40 years, or, putting the facts more hopefully, a crop of good pulpwood may be grown within 40 or 50 years, and that an area as large as Ohio should be planted to spruce to provide a perpetual supply of material for making the newsprint paper demanded in America. One-tenth of the lands from which forests have been cut and which now are, mainly, valueless areas of growing underbrush and dangerous areas of combustible timber tops, would grow the spruce. No pulp, no printing. Printing is a necessity. Posterity might do

without the problem novel, but civilized man cannot do without news.

Forty or 50 years would

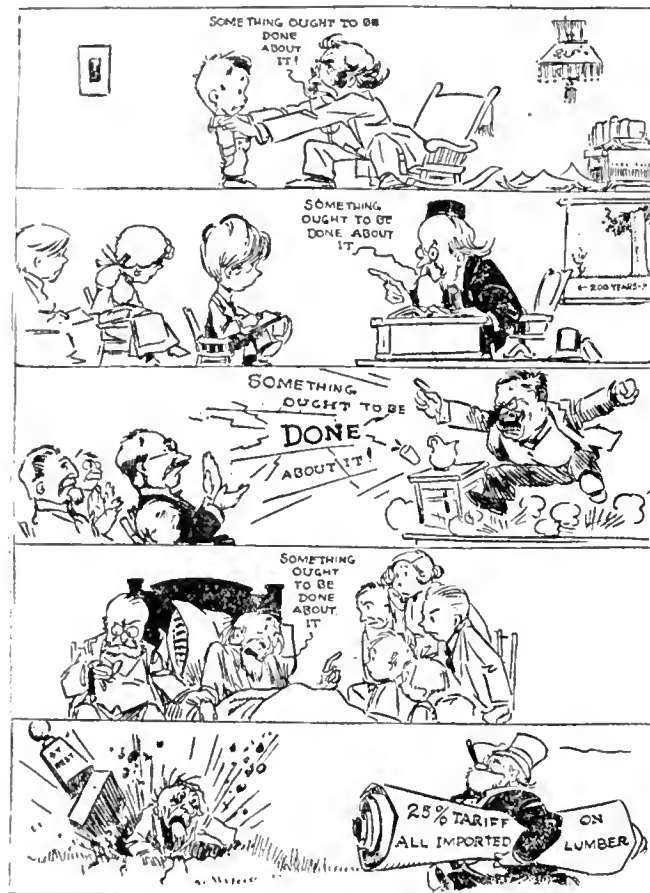
be a long time for an individual to sit down and wait for a crop to mature, but no individual would be kept waiting for the spruce crop. It would be grown while we should continue exhausting the exhaustible supply. Wood pulp is only one of sundry products of forests without which the world cannot do, in so far as the world is at present informed. To depend upon the genius of man to discover some sort of substitute for wood pulp, another substitute for another forest product, is somewhat like seeking a substitute for onions instead of growing onions, despite the fact that a crop of onions may be grown within a few weeks. Until it is found that we do not need forests we shall need forests. Until some way is found to do it more quickly the best plan of producing a supply of wood pulp is to grow it by processes known and practical.

Providence Journal: According to the *American Forestry Association*, "there are 81,000,000 acres of idle land in this country that should be put to work growing trees at once." Mani-

festly the slogan ought to be "Plant a tree," or perhaps as the available idle land amounts to nearly one acre per capita it might be "Plant an acre." Anyway, it seems that the pressing need of the day is for backyard foresters quite as much as for backyard farmers.

Athens (Ga.) Banner: There is no more important matter before the American people so far as material progress is con-

A LIFETIME OF PROGRESS IN FOREST PRESERVATION



J. N. Darling, in the *Washington Herald*.

"there are 81,000,000 acres of idle land in this country that should be put to work growing trees at once." Unfortunately planting trees for posterity doesn't have anything like the same appeal as incurring bonded indebtedness for posterity to pay.

Louisville Courier-Journal: The *American Forestry Association* finds that a crop of good pulpwood cannot be grown in less

SAYS ROCHESTER DEMOCRAT-CHRONICLE

cerned than that of preserving the forests of this country and the reforestation of the country as well. *The American Forestry Association* is doing a great work in this respect. Every citizen should do his part to help these agencies forward the work of forest preservation and reforestation. Organizations cannot do this work alone nor can the federal government do it by itself. The need of assistance from the individual citizens and all kinds of citizen organizations and from the several states as well is apparent.

Milwaukee Journal: In considering a national forest policy we must consider a disease That disease is forest devastation, the *American Forestry Association* points out. Its effect is a slow sapping of national strength—through the steady exhaustion of the national timber supply.

The effect will become fatal when, through the shortage and high cost of timber, the United States is reduced to the level of western Europe, when wood is priced as an imported luxury, when not only manufactures and trade are handicapped by lack of it but the comfort of our own people and the efficiency of our agriculture are straitened by its scarcity.

It is unthinkable that the United States will accept the necessity of curtailing largely, sooner or later, its use of timber. Abundance of wood for home and farm use, for varied manufactures and for export trade has been a primary factor in our commercial supremacy, so important right now, and it is a factor which we are not going to surrender.

The problem must not be met by using less and less wood, down to the level of civilized existence, as France has been compelled to meet it. It must be met not by decreased use, but by increased production, the association well argues. It must be met in the American spirit of development of enterprise, of an organized and far-sighted handling of our resources that will supply the future requirements of a continued liberal use of timber in national development and industries.

Hudson (N. Y.) Republican: Do you

know that the annual consumption of newspaper would make a two-foot strip of newspaper reaching forty million miles or half way to the sun? The war left us in a state of mind whereby no set of figures could stump us or give us pause until this statement from the *American Forestry Association* about the forest situation came along and we must admit that it takes "some trees" to keep industry going in this country. The time has come when we must grow timber.

Oil City Blizzard: The *American Forestry Association's* call on the business men of the country to wake up and join in de-

by complete destruction. We haven't taken any care of the forests, haven't even thought about reforestation, yet this means millions of dollars to the South every year.

Parton (Ill.) Register: Few of us care much about the other fellow's business, but it so happens this phase of the forest products situation is of a piece with a problem that touches our whole economic life, for without forest products, business cannot go on. We cite our end of it to show the tremendous consumption of trees going on every day, to say nothing of loss by fires that sweep the forest areas. The *American Forestry Association* is campaigning for

forest policy legislation. Every publisher in the country should be behind this campaign.

THIS IS ABOUT THE TIME OF THE YEAR WHEN—



—Some idiot at large in the woods starts a forest fire



—which destroys vast areas of beautiful timber.

—McCutcheon, in *The Chicago Tribune*.

manding that Uncle Sam take a hitch in his belt with a national forest policy should be answered by every business organization that faces mounting costs of everything. That would make it unanimous.

Thomasville (Ga.) Enterprise: We glory in the wonder of the pine woods, but we are not ashamed of the reckless abandon with which they are converted into money

Balaton (Minn.) Tribune: Why cannot the towns in all states take up such work and have a municipal woodlot or a community forest? There is plenty of idle land that will grow trees. Forest products are the backbone of all industry, as the *American Forestry Association* points out.

Hunter (N. Y.) Review: The thing needed is a national forest policy as being put forward by the *American Newspaper Publisher's Association*, the *American Forestry Association*, and the *Association of Wood Using Industries*.

Billings (Mont.) Gazette: In other words, says *The Permanent Builder*, which bases its statement on figures from the *American Forestry Association*, nearly one-fifth of all the manufacturing establishments throughout the country use timber in one form or other. Need of a national forest policy, for which the *American Forestry Association* is directing the campaign, is shown by the manufacturing

establishments which pay out annually in the aggregate \$14,250,000,000 for raw materials, and the part of the wood using industries in that huge expenditure amounts to more than \$1,000,000,000, or 7 per cent. Indeed, trees seem to be closely related to the payroll and to national prosperity.

Waco (Texas) Times: The total number of forest fires exceed 30,000 a year.

From this it may be discerned that an average fire would not need be very extensive for the total loss to reach a staggering figure.

Charleston (S. C.) American:—There is no doubt much truth in the statement by Charles Lathrop Pack, president of the *American Forestry Association*, that in reforestation the south has great opportunity for wealth and for national service. As Mr. Pack pointed out, reforestation is badly needed in many sections of the south. The expert said the reclamation the south needs is of two classes—lands reclaimed for cultivation and those for forests. The forestry conference is important to all the people of the south, and it is to be hoped that plans will be made which will assure improvement in the present conditions and at the same time increase the wealth of the entire country. The matter of the preservation and reclamation of our forests is one of the most important problems of the country and yet comparatively few people realize it.

Atlanta Journal:—Atlanta is happy and honored to have as guests those particularly useful friends of conservation who are co-operating as the Southern Forestry Congress. Their cause is of national import and of utmost economic and human significance. Scarcely a region of the common country but suffers either the consequence or threat of the waste and destruc-

tion with which American forests have been treated.

Grand Rapids Herald:—Michigan is particularly interested in the bill introduced in the United States Senate by Senator McCormick, of Illinois, providing for co-operative effort on the part of the states and the federal government in the preservation of present forests and in reforestation. Few states of the Union are as vitally interested in reforestation as Michigan. That is true, because Michigan, originally a great timber state, has now millions of acres of unproductive land, much of which could wisely be given over to reforestation. Congress will be fully justified in taking the steps Senator McCormick proposes, the National Forestry Program Committee, the United States Forest Service and the *American Forestry Association* already having stamped the bill as progressive legislation.

Buffalo Courier:—A crop shortage is serious, but concern should probably be greater for the loss of forests. They cannot be replaced except by long years, at least a generation for even the faster growing of trees of lumber value. In Europe conservation of forests has been greatly advanced compared to what we have done in the United States.

Watertown (N. Y.) Times:—Some person with a penchant for statistics, has fig-

ured out that the annual consumption of newsprint in the United States would make a two-foot strip, reaching forty million miles or half way to the sun. Figured down more closely, he says that something like 5,000 full grown trees go into the waste basket of the country every day. This represents newspapers that have been read and thrown away. These figures come from the *American Forestry Association*, and are believed to be correct. The *American Forestry Association* is endeavoring to impress on the people of the country the economic value of trees. It wants better fire protection methods in the timber lands. We have come to realize the fact that we must grow trees. We have also come to realize the fact that we must use more discretion in cutting them.

Asheville Citizen:—Recent sessions of the *Southern Forestry Congress* in Atlanta appear to be bringing forth fruit in forestry legislation in Georgia. After years of declaration that something ought to be done, the people have decided to do something. The determination to conserve comes, it is true, too late to save to the people millions of dollars in timber, in erosion by flood and in the injurious effects of treeless wastes on climatic conditions. But the investment in a common-sense system of forestry is nevertheless a sound one; it is more than that, since it is the only way to prevent absolute destruction of forest resources.

REORGANIZATION OF COLORADO STATE FORESTRY ASSOCIATION

Reorganization of the Colorado State Forestry Association was effected in Denver during the evening of October 27, 1921, following a banquet attended by about twenty. Lou D. Sweet, prominent agriculturist and a leader in many public movements, was elected President. A. T. Steinel, the very live editor of "Western Farm Life," was chosen Secretary-Treasurer. A board of nine members was also elected, including two of the old board, Dr. John Grass and Frank C. Goudy, the heads of the two forestry schools in the State, Prof. Gordon Parker and Prof. W. J. Morrill, a representative from the State University, Dr. R. C. Lewis, Mr. H. M. Wheeler from the U. S. Forest Service, Mrs. Mary Louise Stickley representing the Federated Womens Clubs, Benjamin Griffith formerly Attorney General, and C. L. Hoyer, a leader in many agricultural organizations.

Prof. W. J. Morrill presided and spoke of the history of the organization. He said that at the time of the admission of Colorado as a state into the Union, a prominent civil engineer residing in the state, Frederick J. Ebert, trained as a professional forester in Germany, called attention to the necessity of forestry. He advocated that the United States turn over to the state its public forest lands in order

that the state might organize forest protection and forest utilization, and if unwilling to deed the forests to the state, that the United States be urged to save the forests for the future residents. But nothing was done. The forests were being destroyed by reckless exploitation and especially by uncontrolled conflagration during the first twenty years of statehood. Finally Col. Edgar T. Ensign of Colorado Springs instituted a series of public appeals through the press, culminating in a call for a meeting in Denver on November 19 and 20, 1884, at which time the Colorado State Forestry Association was organized with Col. Ensign as President.

It will be noted that the Association is among the oldest of the Forestry Associations of the United States, the first being formed in 1876 in St. Paul, Minnesota, and our American Forestry Association was organized in 1882 in Cincinnati as the American Forestry Congress. Public sentiment was guided by the Colorado Association asking that adequate measures be adopted to prevent the destruction of Colorado forests. Finally, in cooperation with forestry movements originating in other sections of the nation, national sentiment, some persistent forestry advocates, and an approving President, caused the inauguration of

the forest reserve policy, after necessary congressional action, intentional or unintentional, in 1891.

During the years of the fight against the Forest Service in the West, from 1906 to 1912, the Colorado State Forestry Association valiantly and effectively lent its assistance to the cause of forestry. During this critical period Mr. W. G. M. Stone, a retired business man and formerly a clergyman, was the President of the Association. His whole heart and his whole time was devoted to the forestry cause and all without remuneration. After the campaign against National Forests had died down, Mr. Stone held the organization together by his personality and by the sense of loyalty to him as a leader. Many members felt that the great usefulness of the organization was over, that the battle for forest conservation in Colorado had been won. Soon after, Mr. Stone died, among the youngest of very old men I have ever known. His memory will always inspire all who knew him. The world war soon engrossed our attentions and the Association remained in a dormant condition until revived at the present time.

Col. A. S. Peck spoke on the value of the organization as support in his work in administering the National Forests.

PLEASANT THINGS TAKEN FROM LETTERS TO THE EDITOR

"AMERICAN FORESTRY is well worth the money and we would miss it greatly if we did not take it."

OSBORNE & CLARK LUMBER COMPANY.

"I find the magazine useful and like to have it."

M. B. KANNOVSKI.

"I take pleasure in expressing appreciation for the AMERICAN FORESTRY magazine, which is a most valuable publication."

WILLIAM O. SMITH, Hawaii.

"I appreciate the need of your Association and the value of its work."

(Prof.) GEO. H. BARTON.

"AMERICAN FORESTRY is a delight to peruse and you deserve the thanks of every nature lover for giving us such a publication."

H. B. DECKER.

"I am very glad to be able to send my check for Sustaining Membership in the American Forestry Association, as I think it is one of the most worth-while organizations in the country, not only from an economic standpoint but from its educational value."

DUDLEY FRENCH.

"I believe every one in the Forest Service recognizes the great value of the AMERICAN FORESTRY Magazine. It is and has been doing the pioneer work which some day will bring a greater realization to the American public of the value of our mountains, watersheds, timber, etc."

THOMAS W. SLOAN.

U. S. Forest Supervisor.

"I have been subscribing to AMERICAN FORESTRY since it was first issued, and it is a welcome visitor to our home."

BERTRAM N. STUMP.

"I want to tell you what a wonderful progress has been made in AMERICAN FORESTRY magazine even in one year. The April number is simply lovely."

MRS. H. E. BREWER.

"Your Association has been doing a wonderful work and I am greatly interested in seeing it continue to be the wonderful success it is."

CYRUS E. WOODS.

"You will find enclosed a money order for \$4.00, which even it were my last would go to continue my subscription to the AMERICAN FORESTRY magazine."

BEN KRIM.

"I thoroughly enjoyed the article in the July issue entitled "Snake Lore for Forest Lovers" by R. W. Shufeldt. I am glad to see this neglected and misunderstood phase of biology presented in such an excellent manner. I certainly hope that more articles on the same subject appear from time to time in order that the general public, yes and scientific people, may come to realize the great and valuable role played in Nature by reptiles."

DONALD L. BURDICK.

"We are very much pleased with Mr. Pack's article in the July number of your splendid magazine."

W. H. SULLIVAN.

"I am always much interested in the articles in AMERICAN FORESTRY and would not wish to miss a single copy."

H. C. MITCHELL.

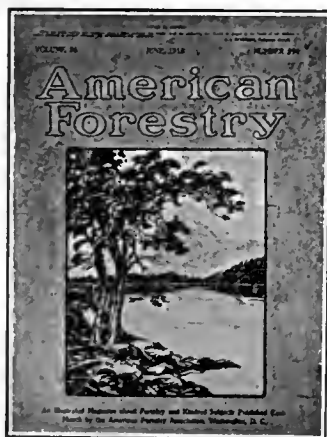
"The magazine (June) is a rich one—strongly interesting from first to last. Gleason's and Demaray's articles, with their richness of fine illustration, are sure to be so attractive to the general reader that I am pleased to place it in our rather meagerly equipped library."

R. H. YOUNG.

BECOME A MEMBER

Any person may become a member of the American Forestry Association upon application and payment of dues.

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LUMBER CUT IN 1920

The lumber cut of the United States in 1920 was 33,798,800,000 feet, which is 2.2 per cent less than in 1919, and 27 per cent less than the peak in 1907.

The average price of lumber at the mill increased to \$38.12 per thousand, which is a rise of 150 per cent since 1910. The aggregate value of the cut is \$1,299,000,000. These are the highest annual valuations ever recorded, but do not indicate present conditions. They merely reflect the extremely high peak in the post-war lumber prices which was passed in the first quarter of 1920.

These are the principal statistics obtained by the Forest Service, United States Department of Agriculture, in its 1920 canvass of American sawmills. They are based upon reports from 15,978 active mills out of 23,213 estimated to have been in operation. Several thousand mills cutting less than 50,000 feet were not tabulated, though allowance was made for their cut. Comparisons with 1919 are published by permission of the Bureau of the Census, United States Department of Commerce.

The tables show that the States which increased their cut are all in the Pacific Coast group and the Rocky Mountains. Washington is first, as usual. Oregon attains second place for the first time, displacing Louisiana from a position held for 15 years, while California takes rank among the first five, displacing another southern yellow pine State.

VAST AREA OF IDLE TIMBERLAND

"The United States produces more than half of the entire lumber cut of the world," says Col. W. B. Greeley, Chief of the Forest Service, United States Department of Agriculture, and uses 95 per cent of that amount right here at home. The exhaustion of our timber supply is coming about, not because we have used our forests freely, but because we have failed to use our timber-growing land. The problem in a nutshell is the enormous area of forest land which has been so logged and burned that it is producing little or nothing. We have more than 80,000,000 acres, an area greater than all the forests of France, Belgium, Holland, Denmark, Germany, Switzerland, Spain and Portugal, which have been denuded to the point of absolute idleness so far as the production of any timber of commercial value is concerned. We have other enormous areas of cut-over land now growing but a fraction of the amount of timber which they might produce. And we are adding to these areas of idle or largely idle land from 10,000,000 to 15,000,000 acres every year, as destructive logging and still more destructive burning progress.

"This situation," the Forester points out, "can not long continue without grave consequences. If we are to remain a Nation of wood users, we must become a Nation of wood growers. By some means or other we must see to it that forest lands not needed for agriculture are not allowed to lie idle, but are kept at work growing timber.

"Where Americans need more forests," states Col. Greeley, "is largely on these 80,000,000 timber-denuded acres which could be made productive again with proper attention and protection against fires." Some of the chief reasons why these forests are needed are as follows:

Our manufacturing centers are drawing at an enormous rate upon our timber supply—from two to four times as fast per capita as the country at large.

"Our railroads require 125,000,000 wooden crossties annually to maintain their roadbeds in fit condition and take care of new construction.

"Our average American uses 125 pounds of paper a year—made largely from wood—and the growing circulation of our newspapers and magazines is increasing that very generous per capita allowance.

"Our average well-kept farms, using the Upper Mississippi Valley as an instance, require 2,000 board feet of lumber annually for repairs and improvements.

"Our Florida citrus crop alone, for marketing, takes 13,000,000 boxes of 5½ board feet each, every year."

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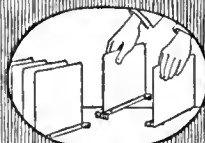
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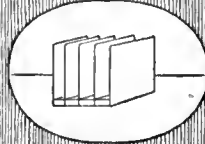
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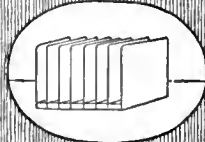
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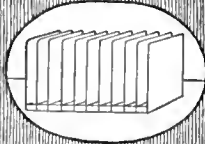
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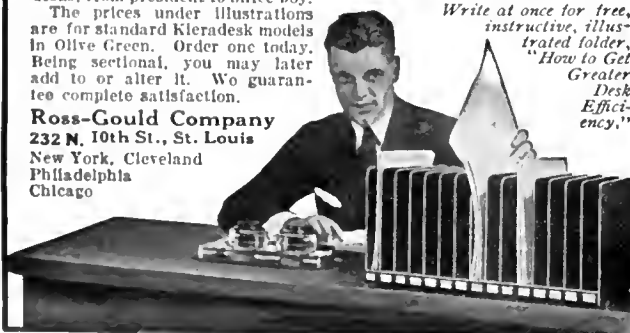
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FOREST PROTECTION IN PENNSYLVANIA

Forester Pinchot of Pennsylvania has devised a method of fixing the legal and financial responsibility for all forest fires, and in his new organization men who combat fires will receive pay commensurate with services performed.

Nowhere in the United States has so complete a plan been perfected for the prompt detection and extinction of fires, and for the inspection and elimination of hazards.

An appropriation of \$1,000,000 by the Legislature for forest protection has made it possible for the Department of Forestry to purchase and erect 50 steel forest fire observation towers. Most of these towers are sixty feet high, and they have been put up on the highest mountain tops in the State. Eighteen other steel towers were previously erected, giving the Department of Forestry sixty-eight stations from which observers may detect and locate forest fires. Every one of the towers is connected by telephone with men in nearby communities whose duty it is to respond with a crew of men to attack the flames when fire is discovered.

Roads and trails have been constructed in many of the State Forests, so that the remote sections are now more accessible to foresters and their fire-fighting crews. Each forest district has been divided into blocks of forest land, extending from 50,000 to 150,000 acres. Each area is in charge of an inspector, each tower is manned by a towerman, fire bosses have been elected from the best fire wardens located at convenient points for the suppression of fire.

Fire crews have been organized, equipped and trained so that they are ready immediately to respond when calls come to the fire bosses from towermen or inspectors. Patrolmen and wardens are other units in the fire protective organization.

This organization, heading in the office of each District Forester, has given Pennsylvania a systematic plan for the prevention of forest fires that is far better than anything of a similar nature that has been attained in this country.

GEORGIA COMMITTEE INCREASES

New members are being added to the Georgia Committee of Forestry and plans are going forward for the work. This committee is separate and apart from the Georgia State Board of Forestry, which recently met at the State Capitol in the offices of Governor Hardwick, who is an ex-officio member of the Board. The membership of the Georgia Forestry Committee includes the names of many of the most prominent men and women in the State, and the interest and activity already evident gives promise of vigorous accomplishment.



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The National, State and Local Tuberculosis Associations of the United States

INCREASED PRODUCTION OF NAVAL STORES.

Compilation of reports from the individual producers and consumers of naval stores for the 1920 producing season by the Bureau of Chemistry, United States Department of Agriculture, shows that 488,548 casks of gum spirits of turpentine and 1,577,398 round barrels of gum rosin were made. There were on hand at the stills on March 31, 1921, the close of the 1920 season, 30,429 casks of spirits of turpentine and 327,055 round barrels of rosin.

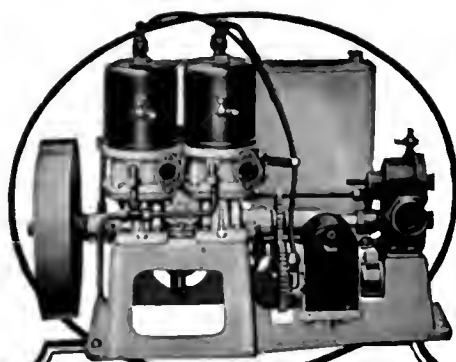
During the calendar year 1920 a total of 34,932 casks of wood turpentine and 180,-

138 barrels of wood rosin and reclaimed rosin were made. The stocks at wood-distilling and rosin-reclaiming plants on December 31, 1920, were 7,616 casks of turpentine and 50,882 barrels of rosin.

On March 31, 1921, the consuming industries of the country had on hand or in transit to the plants a total of 30,528 casks of turpentine and 217,302 barrels of rosin. On this same date the stocks at the ports and in hands of large dealers and jobbers at the principal distributing points of the country were 74,686 casks of turpentine and 479,142 barrels of rosin.

STATE FORESTERS STUDY BLISTER RUST

(Continued from page 782)

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DOMESTIC EXPORT

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IS A FRIEND INDEED**

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generally distributed, resulting in pine infection of great intensity. On an acre plot, typical of conditions over an area of several thousand acres, the foresters found 70 per cent of the trees under 10 feet high attacked by the disease, mostly 1919 infection. The pine growth is very dense, but nevertheless, approximately 400 wild gooseberry and skunk currant bushes were found on the acre. A pine tree 7 inches in diameter, breast height, had 50 cankers on its stem and lower branches, within 8 feet of the ground.

A stop was made to inspect a white pine planting made in 1909, where the disease was first introduced into the North Hudson section. The planting stock was imported from a German nursery. From 1917 to 1920 blister rust was found on a few pines here and there within a radius of ten miles of this plantation. In the spring and summer of 1921, millions of cankers developed on the pines in this territory, due to general infection of currant and gooseberry bushes in 1919. So severe is the infection on the pines that it can best be likened to the effects of forest fire.

Returning to Chestertown, the foresters saw the Faxon white pine plantation, now 37 years old, which is producing lumber at the rate of approximately a thousand feet B. M. per annum. In the same locality, a visit was made to a ten acre tract which was cultivated in 1865 and bore no tree growth prior to 1874. White pine seed trees grew on adjacent land and there is now a splendid growth of straight, clean pine, 47 years old, 90 to 100 feet high, with many trees 18 to 19 inches in diameter, breast height. Sample plots were measured by a timber estimator of the New York Conservation Commission, and the Massachusetts white pine volume table was applied. On one quarter-acre plot the yield was estimated to be at the rate of 78,000 feet B. M. per acre, and on another plot it exceeded 87,000 feet B. M. to the acre. Pine from a portion of this tract was sold last winter at a price which netted the owner \$17.50 per thousand feet B. M. "on the stump."

It is safe to estimate that this stand will average 47 thousand feet per acre, or a growth of a thousand feet B. M. per annum. In 1918 the currants and gooseberries were removed from this tract at a cost of less than a dollar per acre. A portion of the area was cut over last winter and a very heavy seedling growth of white

pine has developed from last year's seed crop, since a few seedling wild gooseberry bushes will spring up among these small pines, the ground will have to be covered again, within the next three or four years, but the probable cost will not exceed 50 cents per acre for the second working. An insurance charge of 20 cents per year for protecting a pine crop that yields at the rate of \$17.50 annually, makes it clear that white pine can still be grown profitably in spite of the blister rust. But pine cannot be grown commercially in the infected regions if currant and gooseberry bushes are not eradicated.

The Society for the Protection of New Hampshire Forests held its annual meeting on August 31 and September 1 at North Woodstock, N. H. On September 2, many of those in attendance motored to Littleton, N. H. to view the extensive damage from blister rust in that locality. For many miles around Littleton, infection is general, plot studies showing from 50 to 90 per cent of the pines attacked. Currants and gooseberries have been eradicated from much of the land in this locality at costs ranging from 75 cents to \$1.00 per acre. However, the destruction of currants and gooseberries protects only the healthy pines. It cannot save pines infected before the work is done.

Both the New York and the New Hampshire meetings passed strong resolutions, urging pine owners in the Northeastern States at once to uproot currants and gooseberries within 200 to 300 yards of the pines. More adequate State and Federal appropriations were also urged for instructing pine owners in regard to the disease and demonstrating methods of control. Those in attendance at these meetings saw convincing evidence of the destructive power of the blister rust. The point was made clear to all that the disease can be controlled at a reasonable cost, by destroying currants and gooseberries within 200 to 300 feet of the pines. However, it is readily seen that not many land owners will go to the trouble of uprooting wild currants and gooseberry bushes until they are aware of the presence of the rust on their pines. Few pine owners know all species of wild currants and gooseberries, nor is it possible to clear the ground of these bushes if the work is done in an un-systematic, hit-or-miss manner. A few hours spent in practical demonstration accomplishes results that cannot be obtained through printed warnings and instructions.

ENGLAND'S NEW FOREST POLICY

(Continued From Page 754.)

indeed the appropriation to deal with unemployment may prove to have been the only thing which tided the Commission over the immediate emergency. Public

opinion alone is a permanent guarantee against a failure, which to the British nation would be little less than calamitous.

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BOASTS VENERABLE TREES

Some of the oldest plantations of forest trees in New York State have been discovered at Millbrook, Dutchess county, by workers from the forestry department of the state agricultural college at Ithaca, according to the local paper, "The Mirror and Reading Table." The record trees are on the Dieterich Estate at Millbrook, and are in a forest preserved principally as a home for game, where deer and other animals have the freedom of the woods.

Members of the forestry department of the college are available, usually through county agents, to look over forest plantings and give advice and help as to the benefits of this long time crop.

REVISING POLE SPECIFICATIONS

AT the request of the overhead systems committee of the National Electric Light Association the Forest Products Laboratory is collecting data on the taper and strength of various pole species, including southern yellow pine, chestnut, western red cedar and northern white cedar, in order to check up, or, if need be, revise their standard specifications for poles. Data are also being collected on the efficiency of various treatments commonly used for poles. These data are based on the results of service tests by the Forest Products Laboratory that have extended over a period of approximately fourteen years.

MORE FOREST EXPERIMENT STATIONS

America must take measures to meet a critical timber situation which is yearly becoming more critical, the Forest Service, United States Department of Agriculture, reports in a review of conditions existing in the forests and the wood-consuming industries. The ax has cut to the heart of eastern American forests and immediate steps should be taken to grow timber if this country is to avoid dependence on foreign supplies with drastic limitations in amount and the excessive prices which such a situation would impose.

"We have already cut or burned over five-sixths of our original timber area of 822,000,000 acres," says the report. "Three-fourths of our total utilization and practically all the high grade material is still from virgin stands. We can not indefinitely use or destroy 26,000,000,000 cubic feet a year and grow only 6,000,000,000. We shall soon have to grow a much larger part of the 20,000,000,000-foot difference. Forest experiment stations are needed to find out and demonstrate how to grow this enormous volume of wood."

Eventually 10 such stations, each with a technical staff of from 6 to 12 men, are needed, the service states, 5 in the East, 3 in the Rocky Mountains and 2 on the Pacific coast. At the present time there are 2 stations in the East and 1 in the West, the others, through lack of funds, being reduced to a one-man basis. Where the proposed stations are needed is summarized as follows:

In the Southern pine belt, where four-fifths of the original 650,000,000,000 feet have been cut since 1870, chiefly since 1890, and where the crest of production already has passed, and with it is going world leadership in the naval-stores industry. That leadership, it is stated, is passing to the artificially established maritime forests of France.

In the Lake States where a supposedly inexhaustible supply has disappeared precipitately within the past 20 years and where utterly inadequate steps to reforest are being made.

In the Northeast, where the timber problems of New England, and northern and eastern New York press for solution, with the Government doing no research work of that kind whatever.

In the Alleghanias, where forest problems of Pennsylvania, southern and western New York, Ohio, Maryland, New Jersey and Delaware are also receiving no investigative attention from the Federal Government, although production has fallen spectacularly and a tremendous acreage is barren of trees at this time.

In the Appalachian Mountain forest region, chief source of the hardwood sup-

ply, where production has decreased nearly 60 per cent in 9 years.

In the various Rocky Mountain ranges, where 3 stations would cover, respectively, central and northern Idaho, western Washington and western Montana; the central Rocky Mountain region; and Arizona, New Mexico and Southern Utah. Artificial reforestation probably will be necessary there to place timber on 5,000,000 acres of waste lands.

On the Pacific coast—2 stations—where over half of the present remaining timber supply is located.

GOING TO THE PRAIRIE FOR TREES

One does not go to the Arctic for fruit nor seek furs in the tropics and the last place on earth the average individual would think of securing trees would be the Canadian prairies. The very word conjures up a picture of vast stretches of interminable treeless plains, for a great section of the people of the continent are unaware of what a misnomer the term is and how these plains made to glow golden with the first grain of the country have been beautified by the extensive planting of trees of every sort which thrive lustily as if sprung naturally from the soil.

That the whole continent does come to the Canadian prairies for trees is evident in the history of the Prairie Nurseries in Saskatchewan, the largest nursery concern in Western Canada and claimed to be the largest grower of Caragana and Russian poplar in the world. Not only have millions of trees been sent out to cover the Prairie Provinces from the nursery but their product is shipped as far east as Fort William and as far north as the Peace River Country. Nurseries in British Columbia and Ontario also purchase considerable stock from it, and shipments of considerable size have been made to the United States, these including in the past year, 140,000 Caragana and 80,000 Box Elders or Manitoba Maples.

The greater part of the nursery is taken up with plantations of the hardiest trees and shrubs, Russian Poplar, Laurel Willows, Manitoba Maples and Caragana. A beautiful new hedge shrub, the Russian Olive, as well as Buckthorn, is also grown largely for hedges, but the Caragana is the most popular and 3,000,000 seedlings of this variety were grown this year. A large stock of the hardiest apples, plums, cherries and small fruits is grown with the demand increasing every year. The demand for fruits and ornamental shrubs taxes the utmost resources of the nursery, especially currants, raspberries, and strawberries.

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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will make your friend grateful. That is the Subscribing Membership fee for one year in the American Forestry Association.

PLANTING FOR REVENUE

Forty years ago Charles W. Garfield then Secretary of the Michigan State Board of Horticulture, arranged a program dealing with farm forestry which was given in the opera house at Hillsdale. It was provoking that an interesting program enlisted little response, and Mr. Garfield said to the farmers assembled, "The time will come, if you maintain this attitude, that you will be crying for some means to cope with the coal barons, and you will have lost your leverage." During the war there was a coal shortage, and those charged with the distribution of the inadequate supply said, "It seems fair to take care first of the need of townspeople." Farmers should have fuel from their woodlands." The coal shortage gave an impetus to farm forestry.

Several years ago the Grand Rapids Board of Trade purchased 10,000 elm trees in France, which, with transportation, cost only a few cents apiece, and distributed them for planting on Arbor Day. In advance, business men spoke at all the schools to give instructions for successful planting. About 70 per cent of the trees lived. How far-reaching would be the result if every one of the 150,000 population of Grand Rapids would make himself responsible for the planting of one tree! Mr. Garfield has hope that some start may be made on such a program next spring.

Further than street planting, Grand Rapids should establish and maintain forests for future revenue. It might be necessary to give the recreational value of such forests the greater prominence at the outset to enlist sufficient interest, but Mr. Garfield feels sure that as in the case of Zurich's town forest, such a venture would eventually yield revenue to the city.

NOVEL FOREST FIRE EXHIBIT

Ernest L. Metcalf, the forest fire warden of Franklin, Massachusetts, placed a unique exhibit in the Labor Day parade in his town. It consisted of three trucks. He dug up in the forest and transferred to one of these trucks a section of burned land, with its burned embers and charred stubs, just as it looked in the woods. To heighten the effect, smudge fires on the truck gave off clouds of smoke. On the second truck he showed the remedy for this sort of burned land—reforestation, by displaying young pines from four to ten years old set in earth. The third truck was the town forest fire apparatus, with full equipment. Along the route of the parade he gave out announcements of the free distribution of young trees which were to be given to school children for planting, and which were furnished by the State Nursery at Bridgewater.

MAKING EVERGREEN TRANS-PLANTING PRACTICAL

Transplanting anything from a head of lettuce to a large evergreen is always a fussy job and one that is not always successful. In fact, with the large plants and trees, says the *Scientific American*, transplanting becomes difficult and problematical, especially in the case of evergreens which often die after being transplanted. This is attributed to the fact that the sacking enclosing the roots and earth ball forms more or less a flexible container, and the jars incidental to transportation quickly cause the earth around the vital roots to become loosened therefrom with serious or even fatal results.

With these facts in mind Lionel Weil of Goldsboro, North Carolina, has invented a transplanting receptacle which may be employed in transplanting all types of plants but more particularly trees of a less heavy nature. The receptacle consists of a metal casing, properly hinged, which is placed around the roots and earth ball of the tree to be transplanted. Metal slides at the bottom of the receptacle prevent the dirt from falling out of the tapered receptacle. Straps and buckles hold the earth ball firmly in place. In transplanting the tree a hole is first dug, after which the tree or plant with the receptacle still about it is placed in position. The bottom slides are removed, the buckles undone, and the receptacle is removed, following which earth is packed around the earth ball containing the unimpaired roots.

PENNSYLVANIA'S PULP INDUSTRY

To maintain the pulp mills of Pennsylvania and supply them continuously with wood there will be required 500,000 acres of well-managed forest land. There are 13 pulp mills in the State and they consume about one-half million cords of wood every year. These figures were compiled by the Pennsylvania Department of Forestry at the conclusion of a survey of the pulpwood industries. More than \$50,000,000 are invested in Pennsylvania's pulp mills, and last year they gave employment to 7,144 persons. In 1920, they paid for wages and salaries about twelve and one-half million dollars, and they turned out wood pulp valued at more than \$60,000,000. The Department of Forestry's investigation showed that in the pulpwood consumption 55,000 cords of slab and other mill waste were used. This use of mill waste comprises more than 11 per cent of all the wood used in the State. The pulp mills of Pennsylvania consume more than one-third of all the mill waste used by the pulp mills in the nation. Four of the mills within the State import all of the wood they use, and eight of the thirteen mills import more than 75 per cent of the wood they consume, and all but three of the mills import more than 50 per cent of the wood consumed.

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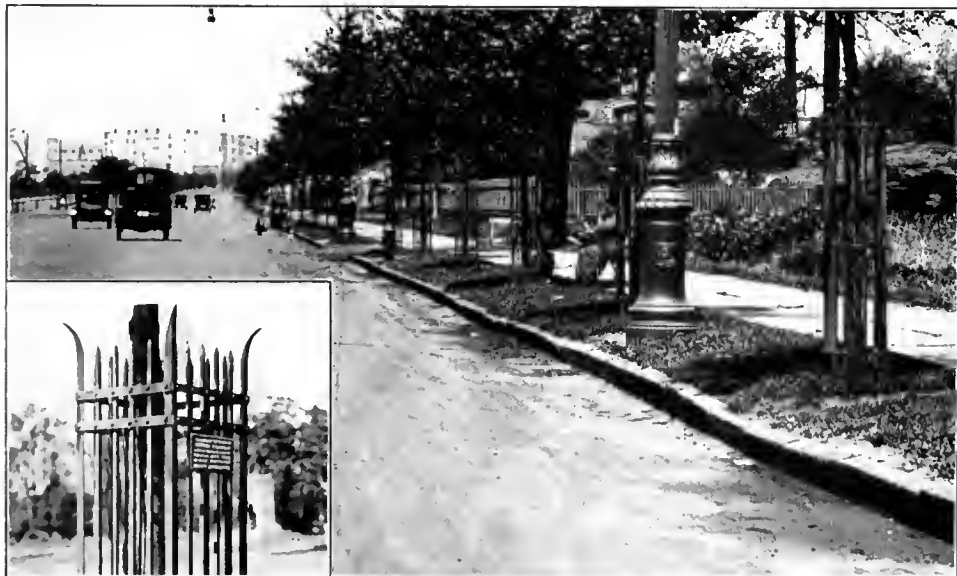
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Dean, School of Forestry
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ATTENTION, FORESTERS

AMERICAN FORESTRY will print, free of charge in this column, advertisements of foresters wanting positions, or of persons having employment to offer foresters. This privilege is also extended to 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.

POSITIONS WANTED

POSITION WANTED as City Forester or Park Superintendent. Have had practical experience as Manager of Private Estates and have been 14 years in present position as Park Superintendent. Desirous of making a change at this time. Address Box 3005, care of AMERICAN FORESTRY, Washington, D. C. (9-11-21)

TREE SURGEON—Formerly employed by the Davey Tree Expert Company, desires to make connection with some reliable company doing work such as tree surgery, or private work on large estate. Will consider reasonable salary to start if good future offers. Address Box 3010, care AMERICAN FORESTRY, Washington, D. C. (9-11-21)

MARRIED MAN would like position as CITY FORESTER or in charge of large private estate. Any forestry position will be considered as a change in locality is desired. Have had technical training and recently graduated from one of the foremost forestry schools of the country. Ex-service man, having spent three years in the service. Address Box 3020, care AMERICAN FORESTRY Magazine, Washington, D. C. (9-11-21)

CITY LANDSCAPE ARCHITECT AND FORESTER, thoroughly conversant with Southern conditions, desires to change. Correspondence invited. Address D, care AMERICAN FORESTRY Magazine, Washington, D. C. (9-11-21)

EX-SERVICE MAN; age 30; married; two and one-half years in forestry college; experienced in city forestry, nursery work, tree surgery, dynamiting and in handling men; wishes position in city forestry or park department any where in northeastern United States. Now employed. Address Box 3025, care AMERICAN FORESTRY MAGAZINE, Washington, D. C. (10-12-21)

WINTER POSITION wanted with lumber company as time keeper or similar work. Graduate of high school and ranger course, 25 years old, good references from previous employers. Address Box 3030, care AMERICAN FORESTRY MAGAZINE, Washington, D. C. (10-12-21)

FORESTER—Graduate of Penn State, 28 years of age, desires work in Forestry or allied lines. Varied experience in Forestry and lumbering. Served with 10th Engineers and with Wood Supply Branch in France. Will consider any outdoor work with a future. Address Box 3035, care AMERICAN FORESTRY MAGAZINE, Washington, D. C. (10-12-21)

WANTED

FORESTERS, UNEMPLOYED OR EMPLOYED, having executive ability and possessing the gift to lead others, to write us. Great opportunity for those that qualify. State age, —reference—(2) if employed. School graduated from (years). Confidential. Rangers also answer this. Address Box 66-66, AMERICAN FORESTRY MAGAZINE, Washington, D. C.

CITY FORESTERS—The Oklahoma Forestry Association, in order to assist cities and towns in Oklahoma to procure men with technical training and practical experience in city forestry work desires names of qualified men. Please send name and address, giving age, training and experience to the Secretary, THE OKLAHOMA FORESTRY ASSOCIATION, Stillwater, Oklahoma.

YALE FOREST SCHOOL

The Yale Forest School has recently received a gift of \$300,000 from William H. Sage, Yale '65, to be used in the erection and maintenance of a building in memory of his son, DeWitt Linn Sage, a member of the class of 1897, which will enable the school to proceed with this improvement on a scale commensurate with the growth of the institution. It will also give much needed space for the proper display of the large collection of woods now owned by the School. The number of wood samples which the School now possesses has been increased to 4,725 by recent gifts from Mr. H. M. Curran lecturer on South American forests. The library of the School which is the largest and best collection of books, periodicals and pamphlets on forestry in this country, outside of the United States Forest Service, will be housed in the new building where it will be secure from the fire hazard to which it is now subjected.

The School has recently received as a legacy a tract of forest land located near Wilkes Barre, Pennsylvania.

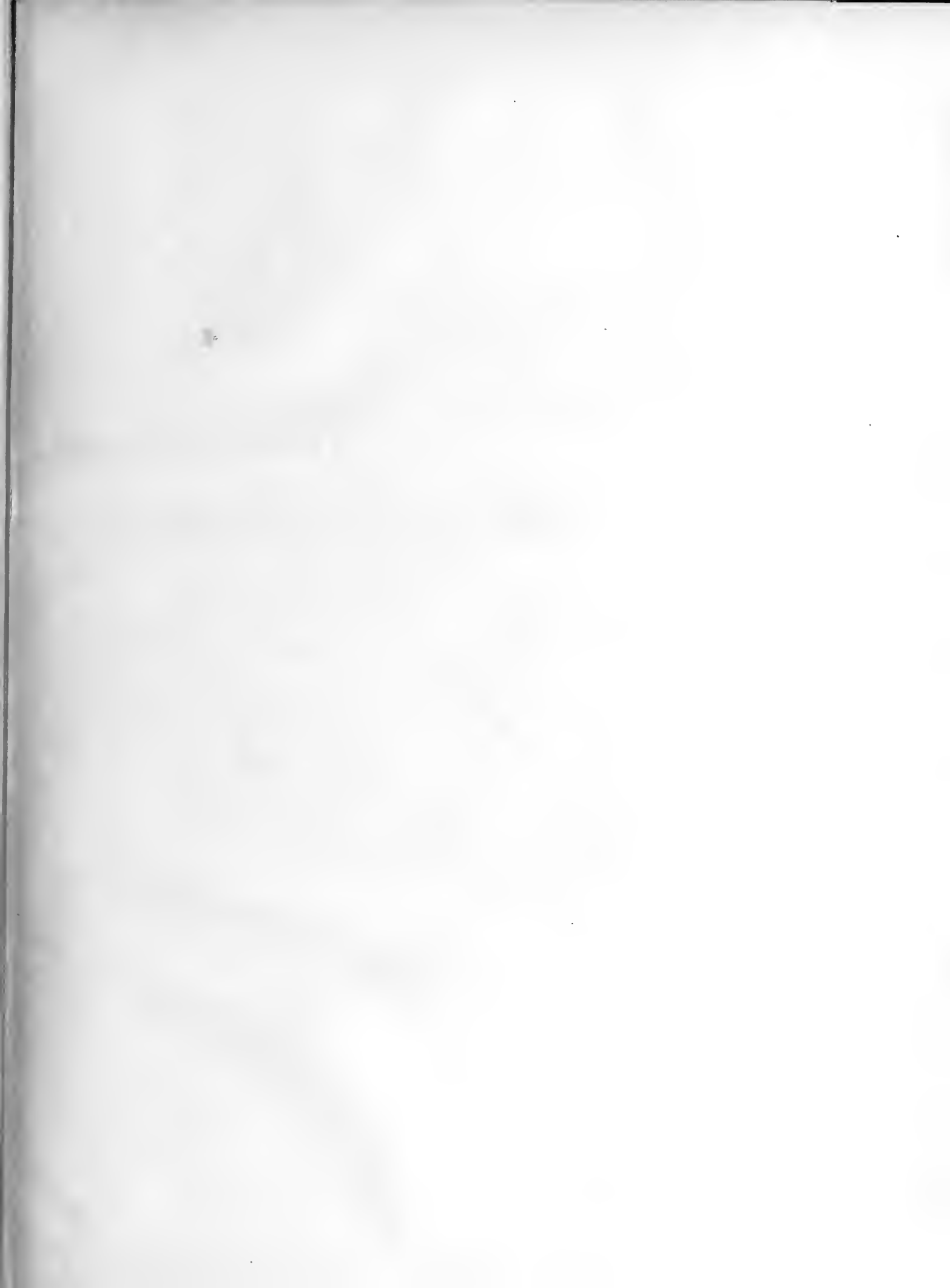
Nineteen students are this year candidates for the degree of Master of Forestry and the total enrollment is forty-two, including seven enrolled for the summer term only. Twenty-four universities and colleges are represented in this attendance. The students come from twelve different states and four foreign countries namely South Africa, Australia, Norway and China.

Prof. S. J. Record is giving a course of lectures to a class of forty members of the New York Lumber Trade Association in New York City.

Research in silviculture is being conducted under a fellowship by F. L. Dumond a graduate student from Cornell University.

ENROLL FOR RANGER COURSE IN IDAHO

The work of the first term in the Ranger Course offered by the Idaho School of Forestry got under way during the week of October 17 with a good enrollment in both the first and second year classes. The fact that the registration again drew men from all sections of the country demonstrates the widely felt need for this class of training. In addition to the regular Ranger Course of two years of five months each, the work at the Idaho School of Forestry is so arranged during the second term that a short course of three months' duration may be secured by rangers, guards and others who cannot spare the time required for a fuller course. This second term course of three months will open January 4, 1922 and close on March 24. Anyone desiring further information in regard to this course should communicate at once with Dean F. G. Miller, School of Forestry, University of Idaho, Moscow, Idaho.





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