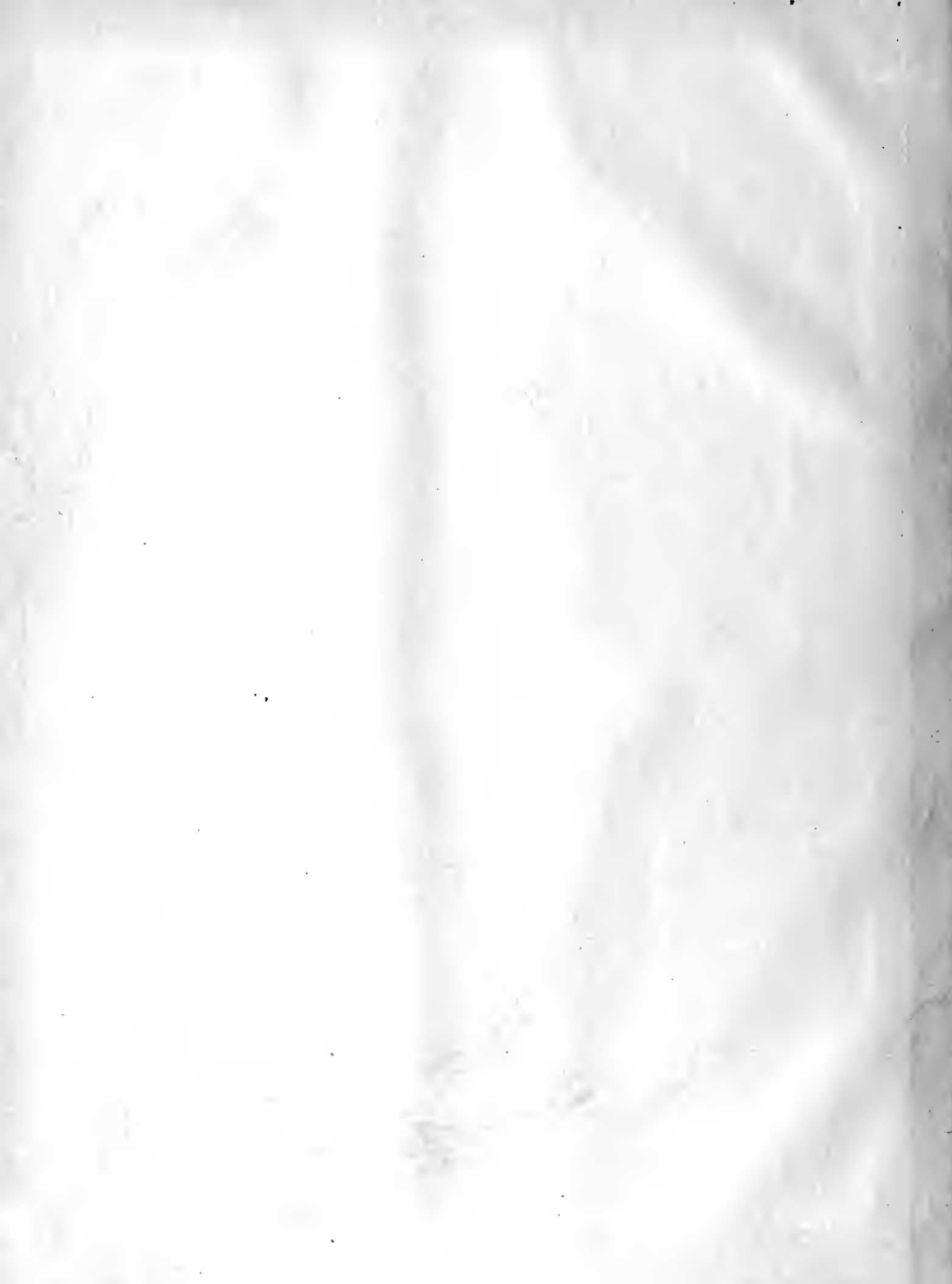


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PERCIVAL SHELDON RIDSDALE, Editor

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"A mighty tree, heir of the forest fair
Transported with its grace and verdure rare,

Star-crowned, it shone radiance divine
And linked the name of Christ with man in hearts ashine,
From lightning, harnessed to the will of man,
Came light and color to perfect the plan,
With art and nature wed to make it fair
The tree was bathed in beauty rich and rare:
One moment shimmering in glorious white
Then colors blending to the soul's delight.

I stood and gazed, my senses filled with joy,
No longer man, but in my heart a boy;
And then I turned, and from the darkness came
A picture of the war and mankind's shame,
I heard the cannonade, the clash of sword,
The awful shrieks that cursed the very Lord,
And then I cried, 'O Christ of Shining Star
Why is Thy peace, Thy power, Thy reign so far?'

I turned again, and blended in the tree,
I saw a vision of the world to be,
I saw the tree a wondrous tree of life
And men forgot their anguish and their strife.
The war no longer raged, and millions came
To take the leaves of healing in Christ's name.

Once more the sick were healed, the lame could dance
And weary men found solace in a glance."

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NO. 301

VICTORY GARDENS!

BY CHARLES LATHROP PACK,

PRESIDENT, NATIONAL WAR GARDEN COMMISSION

WE'VE won the war! Now, keep it won and enjoy the fruits thereof. To do this is going to require continuing effort in order that what has been acquired may be stabilized. Careless relaxation may destroy some of the gains which have been secured.

Much that has been fought for and won with the precious blood of our best and bravest sons, may be lost unless great care is exerted to make the all-important reconstruction days on which we are now embarked and on whose uncharted seas we will be sailing for several years to come, as complete with patriotic effort and conscientious devotion to high duty as the war days through which we passed so bravely and so unflinchingly.

Twenty million tons of food to Europe in 1919! That is the task which has been assigned to the United States as a result of Mr. Hoover's promise to our Allies and the other nations abroad. He knew when he said the word it would be carried out. He knew the American people, what they have done and what they would do.

It is a big order but it will be filled; there is no doubt of that. When that amount was fixed it was the result of careful study of the minimum requirements of America's Allies and the neutrals who are necessarily dependent on this country for a large part of their food supply. Twenty million tons is not all they need, but it is the least amount that will meet their requirements. It was figured out that the American

people without any undue restrictions, without denying themselves to the point of privation, could easily furnish that quantity. It would be well to make it greater if possible, for it would prevent that much more hunger, suffering and starvation in Europe and Asia. It will be

impossible to prevent a certain amount of starvation. This pitiful toll cannot be prevented. Before sufficient quantities of food can be supplied to them from the present diminished granaries of the world, thousands of wretched people who have been near the point of starvation for the past three or four years, will actually have died for lack of food.

The task of America is to reduce this suffering and death to a minimum. Conservation of food will help. But the big problem is to produce. There can be no conservation when there is no production. The war gardeners of the United States have made a wonderful record during the past two years. They can always look back proudly to what they did in the way of increasing the nation's food supplies.

Now they are called on for an even greater task. This phrase, "an even greater task," is used advisedly. There are several reasons why it is true, why

the Victory Gardens of 1919, as the home food producers will now be known, have their biggest year ahead. War gardening has been an evolution, a development. The War Garden was the chrysalis. The Victory Garden is the butterfly. It would be very easy to permit a let

The Fruits of Victory



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Washington, D. C.**

Charles Lathrop Pack, President

P. S. Ridsdale, Secretary

down, in the days of victory, in fact there is grave danger that there will be one. When the "shouting and the tumult die," when the cannon have ceased to roar and when victory is assured, it is so easy to say: "Now we can rest; we have fought and won; there is nothing more to do."

But there must be no slackening. Relaxation may mean ruin. Much of the good that has been wrought may be lost; indeed, worse days may come, days of world-wide pestilence, anarchy and social wreck if famine is allowed to sweep unchecked through the nations. That is why it is more important than ever to keep up the good work, to make the "Victory Gardens" of this year and the next and the next even more numerous, more flourishing, more helpful to this nation and to humanity as a whole, than were the War Gardens of 1917 and 1918. It can be done. I firmly believe that the American people can do greater things than they have ever done before. I am not mistaken about their character and their determination. There were 5,285,000 War Gardens in 1918. Why not make it 10,000,000 in 1919? Let us show the world that we are no "quitters." It's harder to work for something that seems to be accomplished than while the fight is on.

There is, however, another war in progress right now. It is not visible through the marching of soldiers, the bold array of battleships and the reverberation of guns and cannon. But silently, like a thief in the night, the grim monster Hunger is leading his cohorts through the world. Like invisible phantoms, wraiths of the dead, these troops march through town, village and countryside, cutting down women, children and strong men. This is the kind of war in which the world is now engaged. It is the world war for food. It will not be over this year, but it will

last for a number of years, five or ten at least. That is why effort must be made to produce every bit of food possible.

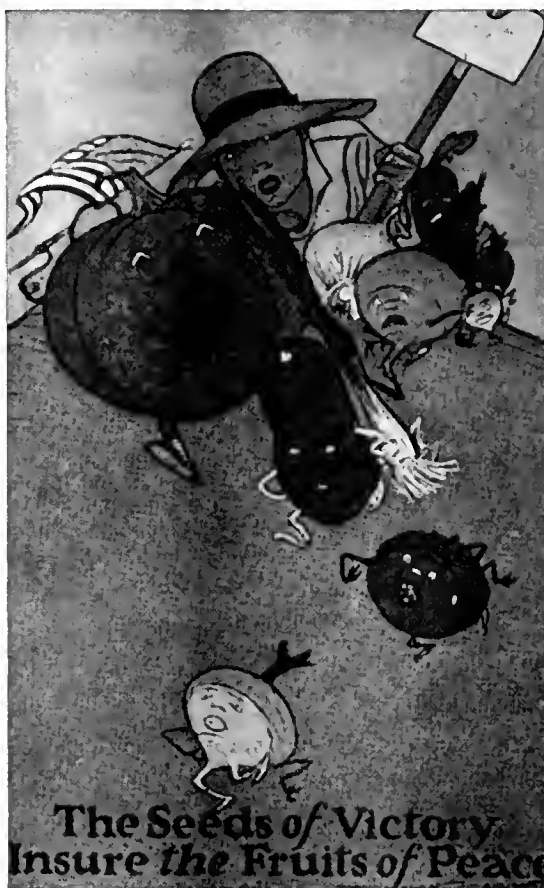
In spite of the fact that there was such marvelous response by the home food growers of the United States last year and that they rounded up the "slacker land" in fine shape, letting very little of it escape, it is believed there can be even greater results. This applies both to numbers and to average production. With the training and the experience they have gained during the past two years it is certain that a majority of the "city farmers"

will be able to raise more beans and tomatoes and cabbage than they have heretofore. And as to the number of gardens — that figure, too, should be increased. All that is necessary is for the people in any particular locality to say: "We had 5,000 gardens last year; we'll make it 8,000 or 10,000 in 1919." Every community doubtless will find a certain number of lots which were not cultivated last year. There were some back yards and a few plots which escaped the general round-up. The thing to do is to get them all into the Victory Garden "draft" of 1919. If every city, town and village will make up its mind to work a little harder in 1919 than in 1918, the thing will be done; and after it is over the ease with which it was accomplished will surprise

everybody. For instance, Boston set out last spring with the idea that it could reach a mark of at least 15,000 War Gardens. When the count was made it was found there were more than 30,000. There were many similar experiences. That shows that any place can "surpass itself" if it determines to do so.

Plans have been made by the National War Garden Commission for a bigger and more intensive campaign this year than was carried on last season. In order that

WAR GARDENS OVER THE TOP



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WASHINGTON, D.C.**

Charles Lathrop Pack, President

Percival S. Ridsdale, Secretary

results be obtained it is necessary to continue the preaching of the lesson of food need. It is only by keeping the thought constantly before the minds of the people that they can be impressed sufficiently with the importance of the work. They must be reminded again and again, "lest they forget." In the press of other work, in the welcoming back of our soldiers—who deserve every tribute that can be paid them—and in the vast business of reconstruction now occupying so much thought, it is essential to keep the home food production idea to the fore. This is being done. Everybody is urged to co-operate.

With plenty of time in which to prepare and with the experience of the past two years as a guide, the National War Garden Commission already has gone far in getting ready for its 1919 campaign. Thousands of posters have already been sent out, especially through the South where garden planting is under way at the time of this writing. Garden books also have been sent out in considerable quantities, as well as several series of short daily garden lessons for the southern papers, to be printed by them for the benefit of their readers. Soon the work will be in full swing throughout the entire country.

Several handsome new posters have been prepared by the Commission and will be used in this year's campaign, along with the beautiful and striking "Sow the Seeds of Victory" poster by James Montgomery Flagg which inspired so many home food producers and attracted so much favorable comment last year. The new designs, one of them entitled "War Gardens Over the Top," and the other, "War Gardens Victorious," are the work of the well-known artist, Maginel Wright Enright. They show the Victory Gardener leading his vegetables on to the conquest of the new world enemy, General Hunger. Instead of a "muni-

tion plant," this year it will be: "Every Garden a Peace Plant." The gardening books to be distributed by the Commission this year, the majority of them already off the press and ready for shipment as called for, are of more attractive and durable form than last year. Improvements have been made in the contents of the book, and they have heavy covers with the Flagg poster on the front in colors.

One of the Commission's representatives, Everett H. Kelley, is now on a tour of the country which has taken him through a large part of the South and will carry him

on to the Pacific Coast, up into the Northwest and all through the Central West. In urging the importance of greater food production "F. O. B. the Kitchen Door," he is conferring with various officials and committees in the cities and towns he visits; and he is illustrating what was done last year by moving pictures which he carries with him showing war gardeners at work. He is accompanied by Mrs. Kelley, who is helping to spread the message. Several other representatives of the Commission will start on tours of the northern parts of the United States in the near future.

Among those who will take an active part this year in stirring up Victory Gardening are the agricultural agents of the United States Railroad Administration. J. L. Ed-

wards, who is in general charge of this branch of the service, has called on the regional directors and the supervisors of agriculture of the different lines, to give this work their careful attention; and as a result the agents are making extensive plans for aggressive work and showing much enthusiasm. Typical of letters received by the Commission is that from B. F. Bush, regional director, Southwestern Region, who says: "I wish to state that the railroads in the Southwestern Region will again

War Gardens Victorious



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Every War Garden a Peace Plant—
— Charles Lathrop Pack, President.
NATIONAL WAR GARDEN COMMISSION
 WASHINGTON, D.C.

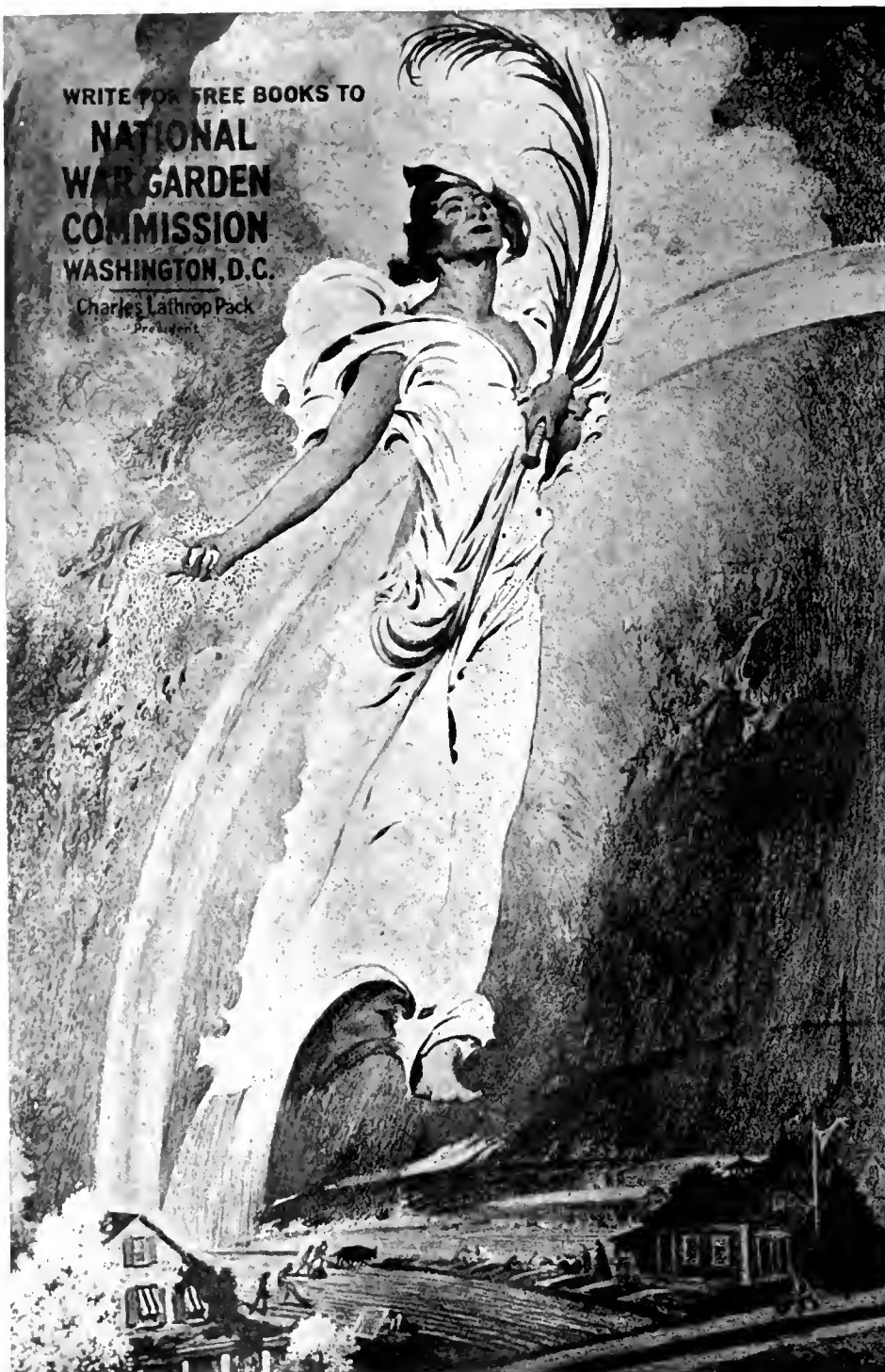
do everything they possibly can in permitting their right-of-way and other station grounds to be used for farming and agricultural purposes;" and from N. D. Maher, regional director, Pocahontas Region, who says: "We will have our agricultural agents co-operate with you in connection with spreading the message of Food F. O. B. the Kitchen Door. There is no doubt that, with all the people to be fed in Europe, the Victory Gardens are as important as the War Gardens." Mr. Kelley is interviewing a number of these officials and arranging plans for further co-operation. The railroads actively supported the War Garden campaign; they will assist equally the Victory Garden campaign.

P. S. Ridsdale, secretary of the Commission, has just been in England attending a War Garden conference with food officials there. While the purpose of his trip to Europe was primarily in the interests of the American Forestry Association, he took occasion to visit the British Isles to offer continued co-operation on the part of the National War Garden Commission in the work of home food production which they are doing abroad. At the same time he has been investigating

methods employed there, particularly relating to gardening by the wounded and recuperating soldiers around hospitals. It is believed that much can be accomplished along that line in the United States this year. Just as it did last year, the Commission again in 1919 will offer

any assistance it can render to foreign countries in stimulating city farming.

That they are recognizing everywhere the greater need there will be for food in 1919, and that preparations are being made for the campaign, is shown by numerous reports to the Commission. The signing of the armistice did not stop the requests Register Webster, of Brooklyn, was receiving for garden permits for next season; and he already had granted more than a thousand such permits. Only one person who had given consent for the use of his land, he says, has withdrawn such permission because the war is over. "Everybody seems to understand," says Mr. Webster, "that the food situation



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 Charles Lathrop Pack
 President

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LIBERTY SOWING the SEEDS of VICTORY

will be just as acute next year and the applications for War Gardens are pouring in just as steadily as if the war were still on." The value of gardening will be emphasized this year in connection with the "Own a Home"

Victory Edition 1919

HOME
CANNING & DRYING
of Vegetables & Fruits



Published by
National War Garden Comm
Washington, D.C.

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THE KAISER IS CANNED—CAN F

idea which real estate dealers all over the United States are taking up and preparing to push with all vigor now that building operations can go forward with increased speed.

That many cities and towns are alive to the needs of the future and the demands for service that will be made upon them, is evidenced by reports which the Commission has been receiving during the past month or so. They are asking for advice as to the plans for the coming year; and in many cases state that they have been busy during the fall and winter in going over their experiences, comparing notes and trying to discover where they have made mistakes and how they can correct them this year so as to improve on their past record. Here is a letter from Urbana, Illinois:

"We have already begun to make plans and get ready for another year. We have a feeling here that the garden should be placed upon a

permanent basis for educational and community purposes and should be made the concrete and objective means of encouraging health, thrift and industry. We have established central offices or headquarters and are now"—this letter was written November 25—"holding frequent meetings and gaining much useful knowledge from an exchange of experiences. The women have taken great interest in the work.

"Personally I have great faith in the influence of the garden as a means of social unity. It should form the foundation for close community organization which should make for individual and local efficiency. This in turn makes for individual prosperity and happiness and means state and national efficiency. The garden with related topics of health and industry appeals to everyone. I vote with both hands to keep and prosper the garden while we have it and so extend and enlarge its scope and vision of usefulness as to make it the means of that

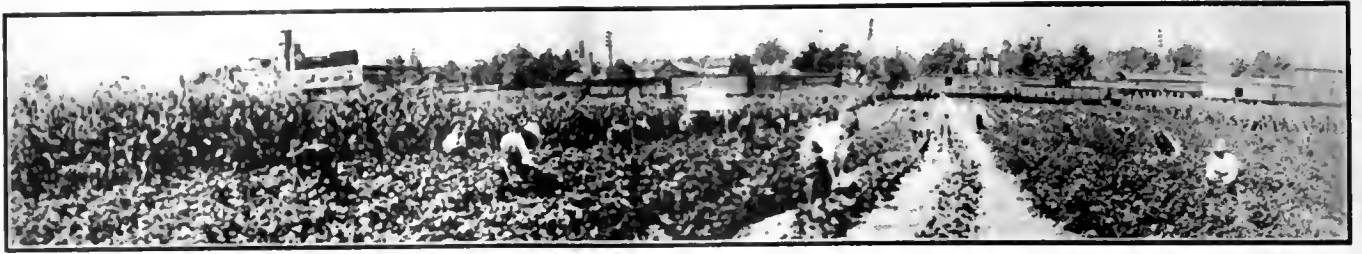
Victory Edition 1919

WAR GARDENING
and Home Storage of Vegetables



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Washington, D.C

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social unity that will mean better life for everyone."

Now if everybody else will "vote with both hands" to continue the garden movement and make it a permanent institution, the problem will be solved. We will have the 10,000,000 Victory Gardens for which we hope. What that will mean to the world cannot be told! It will be impossible to determine the number of lives that may be saved, the suffering and deprivation that will be avoided and the happiness and joy that will come to thousands upon thousands of poor people abroad whose daily bread is of meager quantity and wretched quality. Reports have told how the Ameri-



THE PARADERS

more than any other nation to hold in check and finally crush altogether the terrible foe, Hunger. Mr. Hoover has said there will be seven years of world food shortage. This must be reduced, if possible.

Let the Victory Gardeners now line up! Let them see this war through to a glorious conclusion. Let their motto be: "We have just begun to fight." That speaks the true spirit of America. That was the impulse which sent the boys through at Cantigny and at Chateau Thierry, at St. Mihiel and in the bloody Argonne. The memory of these deeds must be an incentive and an inspiration to every man, woman and



can soldiers as they passed through some of the war-racked villages of northern France and Belgium, took little children upon their knees and shared their rations with them, and of the light which shone upon the thin, sad faces at this act of mercy. The American soldier typifies the United States. This country must now help to feed the world. Uncle Sam has become the Joseph of the Modern World. He must try to stave off the "seven lean years." We alone can do

child in the United States. There can be no finer tribute to the nation's heroes than to make real and lasting the victories for which they died.

In a sense every home garden planted in 1919 will be a monument to the American fighter and to the service he performed in helping to establish firmly for the benefit of all mankind the undying principles of Liberty, Truth and Justice. Every individual, every organization, every community that encourages others or actively





assists in increasing home food production in the United States this year, can feel that it is an act of the truest and deepest humanity.



situation was said to be paramount. That is the question which is of first importance. Once it is solved, other economic and social problems in connection with re-

Said a recent dispatch from the other side: "The enthusiasm in the first flush of allied victory is now giving way to a realization of the appalling conditions and the actual needs of the millions in Belgium and northern France." Anxiety over the food

construction will be well on the way to taking care of themselves. One of the finest and most inspiring slogans which helped the American Army in the carrying through of some apparently impossible war tasks was—"It can't be done. We'll do it." Put that into effect in the home food campaign of 1919.

All the world—that is, all the world worth mentioning—loves a winner. That is why they praise and honor the men who "do things." Is it worth trying to reach that goal of 10,000,000 Victory Gardens? "It can't be done? Let's do it!"



Prize winning exhibit of the Trinity Methodist Church Canning Club at Meriden, Connecticut. This display scored 93 out of a possible 100 points.



This blue-ribbon entry won the National Capitol Prize Certificate offered by the National War Garden Commission; also a prize from the local chamber of commerce.

UNDER THE SUPERVISION OF SIDNEY A. EDWARDS, AGRICULTURAL AGENT OF THE CHAMBER OF COMMERCE, MERIDEN, HAD ONE OF THE LIVELIEST WAR GARDEN AND CANNING CAMPAIGNS IN THE COUNTRY. IN ITS WAR GARDENS THE CITY RAISED ABOUT \$100,000 WORTH OF ITS OWN FOOD. THIS MEANT MUCH IN A CONGESTED MANUFACTURING DISTRICT.

ROOSEVELT THE CONSERVATIONIST

Theodore Roosevelt is dead, but his spirit, his example, live after him, and will ever be a strong influence for better individual and national life. We have lost a great leader in a crisis in the nation's life, a leader who always placed the people's interests before all others, a leader who defended his country, arms in hand in war, freely offering his life, as have his sons in this war and as he himself tried to do. His death at this time is a national calamity, depriving the nation of his wise counsel, his conscientious and courageous leadership, which feared nothing so much as wrong or failure to do his duty. His life, his ideals, his accomplishments will always be an inspiration to those who see in service to humanity, in unselfish endeavor and in duty done, life's best reward.

His voice is silent, but his influence for good lives on. His spirit will march in the van of our armies in war, and in peace it will strengthen our righteous efforts.

True patriot, model citizen, devoted husband and father, wise leader, best type of American, such was Theodore Roosevelt—the world can ill spare him.—Leonard Wood.

CONSERVATION never had a truer friend, a more hearty advocate and a stronger supporter than Theodore Roosevelt. It was he who gave the movement the great impelling force which placed it in the forefront of the nation's big problems. Through his wise foresight in recognizing the vital importance of this subject and his energy in furthering discussion of the question, conservation became what it deserved to be, one of the leading thoughts in the mind of the entire nation.

It was through the first historic Conference of Governors called by President Roosevelt in May, 1908, that there was brought into existence the first concentrated and nation-wide effort to place the conservation movement in the important position which it has occupied ever since. This conference gave dynamic and concrete being and national life to a topic which had been discussed for some years previously. The powerful personality of President Roosevelt and his strong endorsement and virile utterances gave to the conservation movement a firm place among the problems with which the nation had to grapple.

In his address at the opening of the First Conference of Governors, President Roosevelt said: "The prosperity of our people depends directly on the energy and intelligence with which our natural resources are used. It is equally clear that these resources are the final basis of national power and perpetuity. Finally, it is ominously evident that these resources are in the course of rapid exhaustion." Further he said: "Flood prevention, water power development, preservation of



Theodore Roosevelt

We shall recall him as "that tower of strength
That stood four-square to all the winds that blew."

the soil and improvement of navigable rivers are all promoted by a policy of forest conservation." Again expressing himself on this vital theme, he said: "The preservation of the forests is vital to the welfare of every country. China and the Mediterranean countries offer examples of the terrible effect of deforestation." In numerous speeches and in messages to Congress he did not fail to impress strongly upon the people of the United States the need for the future prosperity and well-being of the country of adopting measures looking to proper saving along with proper utilization of all natural resources.

It is eminently fitting, therefore, not only that the memory of what Mr. Roosevelt has done in arousing the thought of the country on this subject should be honored, but that there should be some concrete and lasting evidence expressive of the nation's gratitude for his services to mankind in this direction. It has been proposed by the American Forestry Association of which organization Mr. Roosevelt was formerly vice-president, that this take the form of nation-wide planting of memorial trees and the naming of a great national highway in honor of Theodore Roosevelt. He did more than any

other man to perpetuate the forests of America. In speaking of this tribute to the great conservationist, Charles Lathrop Pack, president of the Association, said:

"No finer tribute can be paid the man who did so much to awaken the country to the value of our national resources. Knowing him as I did, I know he would approve most heartily of the planting of memorial trees—a living lesson of that which he sought to teach."

Trees for Memorials

JUST the other day Mrs. Louis Boex of Cincinnati planted a silver maple in honor of her son Louis, who was a gunner on the *Ticonderoga*. The state of Indiana is urging memorial groves in each of her ninety-two counties. The state forester of Massachusetts suggests that memorial forests be planted. Another plan urges the employment of returning soldiers in planting such forests. Thus has the suggestion by the American Forestry Association that memorial trees be planted in honor of the sailors and soldiers, who gave their lives in the battle against autocracy, taken hold of the public mind. The newspapers are taking up the idea in editorials urging planting of memorial trees.

It is the aim of the American Forestry Association to register all such trees planted in order that a record may be kept for another generation and it is requested that members of the association keep the officers informed of any such activities. The members of the association have a fine opportunity to bring forestry to the fuller attention of the American public by means of this campaign and it is urged that each member place before any local memorial committee the suggestion that memorial trees be planted. Suggest that the committee call upon the state or city forester for advice, and keep the American Forestry Association informed of any developments and plans for planting.

Plans for memorial tree planting take many forms. In Indiana Richard Lieber, the secretary of the Board of Forestry, at the suggestion of Governor Goodrich, proposes to let each county decide the size of its own grove to the memory of their boys. Representatives from these counties will be urged to form a state organization, appoint an executive committee and with the assistance of artists and park experts lay down general principles of

beauty, symmetry and expression to the groves.

From Kansas comes the heartiest indorsement of the memorial tree plan by Governor Capper. He has turned the suggestion over to the new administration with the hope that Arbor Day in Kansas be the banner one in the state's history by the planting of memorial trees along the motor highways crossing that state. The Lincoln Highway has big plans under way in co-operation with the General Federation of Women's Clubs for the planting of memorial trees along that route. In Louisiana "Victory Oaks" are to be planted along the Jefferson Highway and the American Forestry Association is getting letters every day from state and city foresters urging planting along similar motor routes.

The opportunity to beautify the cities is one of the big phases growing out of the memorial tree idea. In St. Louis Park Commissioner Cunliff will plant memorial trees along each side of the famous Lindell Boulevard. In Kansas City a group plan memorial is being discussed which offers a fine opportunity for the planting of memorial trees. In Baltimore discussion is on for a memorial in Mt. Vernon Place that will include avenues and drives with proper tree planting. Philadelphia is discussing a boulevard connecting the University of Pennsylvania and Fairmount Park. Such plans as these of course include fine memorial buildings and arches, but everywhere the conviction is growing that trees as memorials should be incorporated in the plans.

Another suggestion that has come to the American Forestry Association is the one for making the Community Christmas Trees permanent, rather than a new tree every year. C. P. Wilbur, acting state forester of New Jersey, informs the association that there is a permanent tree at Morristown, N. J., in the city park. It would appear that here is a good suggestion for every



AS IF A GUARD OF HONOR

The trees at the foot of the hill upon which stands the most famous monument in the world.

member of the association to work on in his own locality. The permanent tree would, if properly placed and cared for, prove a wonderful inspiration the year around. Alfred Gaskill, the state forester of New Jersey, urges the organization of community units to plant memorial trees in park, public square or school yard. The suggestion has been made by Mrs. John Dickinson Sherman of the General Federation of Women's Clubs that the school children of Chicago plant memorial trees in honor of Mrs. Ella Flag Young. This suggestion can be taken up by other communities who wish to honor educators in a similar way. J. S. Holmes, the state forester of North Carolina informs the association that the General Federation of Women's Clubs in that state has planted "Pershing" and "Liberty" oaks and that the tree planting idea is being taken up by the schools. F. W. Besley, the state forester of Maryland, has a forward going plan which includes the planting of trees in honor of children, thus the tree becomes an object of great interest to the growing child and he comes to take the greatest care of the tree.

Frank William Rane, the state forester of Massachusetts, is urging memorial forests. He points to the fact that there are millions of acres in the country waiting for just such noble endeavor and he suggests that the returning soldiers be employed in this great work. In Oakland a "Victory Park" is being discussed and M. B. Pratt, the deputy state forester of California suggests memorial trees in the municipal auto parking areas that are being established all over the state.

The college campus offers a fine setting for memorial trees and the suggestion has been made that the "old grads" get together and plant trees for the men who answered the call of their country. The elms at Yale, for instance are famous. Every Oberlin man and woman knows Tappan Walk and the famous elm at the corner of the campus of that Ohio college. To enumerate trees with a history would go beyond all space bounds but

some of those most widely known are the elm in whose shade William Penn made his treaty with the Indians; the Charter Oak in Massachusetts; the palmettoes of Charleston, S. C.; the cypress trees at the Jumel mansion in New York City; the Washington Elm at Cambridge; the pin oak trees in Mount Vernon Place, Baltimore, dedicated to eight Maryland men on Washington's staff. More recent plantings have been the 150 Liberty Oaks at Liberty Heights just outside Westminster, Maryland, set by high school boys for the Women's Civic League of Westminster.

State Forester Besley believes this is the first memorial tree planting on such a scale, the trees being distributed along a mile of the road. Look for the opportunity in your city; picture to your fellow-citizens the beauties of forestry and urge the planting of trees in connection with any memorial adopted. Well may we consider France for as Richard Lieber, secretary of the Indiana Board of Forestry, says:

"The Argonne Forest stands as a huge memorial grove to the memory of American and Allied heroes. The Argonne is also a symbol of what a forest will do in war and in time of national peril. Trees are man's best friend.

"Stone and bronze monuments may be heroic and military, they are more often vaingloriously dynastic in purpose. A monument of trees in a well ordered grove is human and humane; it speaks the language of freemen. It is full of solace and hope to the bereaved. As a living and a breathing thing it speaks of victory over death. It is expressive of thanks and devotion by the

people to its heroes, dead and living."

The appeal of the living, growing tree is universal and the American Forestry Association finds that hundreds of organizations are eager to furnish the plan. One of the most recent indorsements of the plan came from the Women's Association of Commerce with headquarters in Chicago and another from the Woman's National



A LIVING MEMORIAL

Mrs. Louis Boex is placing the last spade full of earth around the roots of a silver maple tree—a memorial for her son, Louis Boex, gunner on the Ticonderoga, who lost his life when he was answering the shell-fire of a submarine which afterwards sank the troop ship.



WITH TREES FOR A BACKGROUND

The trees about the famed Bartholdi Fountain in the Botanical Garden at Washington prove without shadow of a doubt that trees are the proper setting for any memorial.

Farm and Garden Association with headquarters in New York City. Everyone sees the coming of the city beautiful in plans for memorials. The tree will have a prominent place in such plans and presents an opportunity for a growing interest in the beauties of forestry. In this work the members of the American Forestry Association have a big part—the great opportunity in fact to interest every organization to which they belong in the value of forestry in general. We all know the

devastation in France that has been pictured to us during the war. The authorities agree that the forests of France kept the Hun from reaching Paris. That should be a great lesson to any country. In our trees lie a great strength; in memorial trees in honor of our soldiers and sailors, whether they lost their lives or not, is a great object lesson as well as a lasting and fitting memorial to those who fought against autocracy.

CARE FOR THE BIRDS IN WINTER

THE *American City* publishes an interesting letter from Ernst Strehle, Park Superintendent of St. Louis, in which he says that a systematic effort has been made to care for their native birds during the winter for the past two years. Continuing Mr. Strehle says:

"So successful has the experiment proved, that we expect to extend the work to all St. Louis parks this winter.

"Feeding stations were established at numerous places throughout the park, and the work of feeding was turned over to one of the employes of the park, who had previously received the proper instructions as to procedure. The food consisted of grains and other seeds, bread and meat, the total amount of food used being about 200 pounds per week throughout the entire winter.

"The following approximate number of birds were regular guests at the feeding stations: Two hundred quail, 50 blue jays, 100 red-headed woodpeckers, 30 three-toed woodpeckers, 100 flickers, 30 winter wrens, 70 brown creepers, 30 red-breasted nuthatches, 150 black-capped chickadees and 30 red birds. Several hundred gray squirrels also took advantage of this opportunity to get food easily.

"About 700 bird boxes, made by the children of the manual training classes of the St. Louis public schools, were distributed and hung in the various parks, under

the supervision of the Park Superintendent, often in the presence of the children who made them. These boxes were made according to the specifications issued by the United States Biological Survey.

"No one can accurately estimate the value of this work, but there can be no doubt that if these birds had not been fed and protected in this way the unusual severity of last winter would have forced them to migrate further south or would have killed them outright. Their loss to Forest Park would have been serious, as they are of considerable value in checking the development of insect life in the park, to say nothing of the pleasure they give to the persons who visit the park during the winter.

"The woodpeckers, for example, or the creepers and nuthatches, whose food in winter consists largely of eggs, pupae and larvae of insects which hibernate in the bark and wood of trees, will demonstrate in a very short time to anyone who will stop to watch them why it is worth while to induce them to remain in a climate otherwise too severe for them. The red bird, and many others likewise, ordinarily seek a sheltered ravine in the deep woods, and seldom winter in the city unless specially induced to stay. With the possible exception of the blue jay, all the birds mentioned have a decided economic value that is many times greater than the cost of feeding and caring for them during the severest winter."

USES OF THE BRAZIL-NUT TREE

BY C. H. PEARSON

THE Brazil-nut tree, called in botanical language, *Bertholletia excelsa*, is one of the most remarkable plants belonging to the monkey pot family. It forms a lofty tree with spreading branches and with a thick rough bark. Its stem averages a hundred feet in height and from two to four feet in diameter. The branches do not appear until near the top where they extend outward and upward in an irregular fashion as shown in the illustration. Its leaves are undivided, arranged alternately upon the branches, about two feet long and from five to six inches wide of a brilliant green. The flowers are yellowish white, more or less inconspicuous, and the fruit, which is produced in the upper branches, is a massive, round, hard-shelled pod from four to six inches in diameter.

This gigantic tree in the South American forests forms immense stretches of forests along the Amazon and Rio Negro rivers, and likewise about Esmeraldas on the Orinoco. The range of the Brazil-nut tree is not well-known, but it is one of a kind very extensive in the country, i. e., those of which both the timber and the fruit are largely available. The majority of the timber trees of Brazil do not yield fruit eaten by man; while the majority of their fruits are obtained from plants not yielding available timber. The Brazil-nut tree affords in its lumber, its fruit, and its bark many useful products which attract our attention.

The wood obtained from the Brazil-nut is highly esteemed in Brazil for building and naval construction and for works exposed to the soil and air. It is hard, heavy, strong and tough and splits with a straight, clean fracture though not so easily as a good many other woods of equal weight and hardness. The wood has a long fiber and is noted for its toughness and durability. It is light brown, tinged with red and turns slightly

darker with age. Considering its hardness the wood works well and takes a very good polish, which it retains. There is an almost inexhaustible supply of this wood and the large forests have scarcely been touched with an ax.

As described above, the fruit of the Brazil-nut tree is an excessively hard-shelled pod which contains from

eighteen to twenty-four edible seeds, so beautifully packed in the shell that when once removed it is impossible to replace them. Although they are called nuts they are not nuts in the botanical sense; in the trade they are generally so considered. Brazil, Para and cream nuts are a few of the more common trade designations. Originally these seeds were exported chiefly from Para, and, therefore, came to be called Para nuts. In Venezuela both the trees and the nuts are called *juvia* and in Brazil the Portuguese name for the seeds is *castanheiro* or *castanheiro do Para*. This name has been corrupted to *castanha*, meaning nut, and the term *castanhais*, means nut orchard.

The gathering of these seeds is an important industry in Brazil. Mr. C. F. Carter in the December issue of the South American, gives a very interesting description of the manner of gather-



A SMALL CLUMP OF BRAZIL NUT TREES

This tree averages a hundred feet in height of stem, and two to four feet in diameter. It is most useful, for its lumber, fruit and even bark yield valuable commercial products.

ing the seeds. He says:

"Early in January, the harvesting parties set out to gather the crop. As the only means of transportation in North Brazil is by water, these parties travel in canoes up the smaller tributaries to the castanhais. Arrived there, the pods are assembled at the foot of the trees, and broken open with the machete, after which the nuts are carried in baskets to the canoes which, when loaded, are taken down the small streams to the larger rivers navigable by steamboats. As the river steamers are unable either to maintain regular schedules or await the arrival of gathering parties with

nuts it is necessary that the nuts be left on the river bank in what are known as "paioes." These paioes consist of cleared spaces protected from the hot sun and tropical rains by palm leaf shelters. However, these paioes are inadequate and, in consequence, the nuts sustain more or less injury at this stage, according to the length of time they remain in the paioes.

In a few districts, the custom of washing the nuts prevails. The method now in vogue is the same as was employed generations ago. In these districts, when the canoes arrive from the castanhals, the nuts are transferred from the smaller boats in small wicker baskets



Courtesy the South American

LOADING THE NUTS ON SMALL BOATS

The only means of transportation in North Brazil is by water and so the harvesting parties travel in canoes to the castanhals, or orchards, where the nuts are carried to the canoes in baskets for loading.

which are immersed in the stream several times. By this process the accumulated dirt is washed off and imperfect nuts rise to the surface and float away. The cleaned nuts are passed on to the larger canoes or lighters and are later transferred to the river steamers for transport to Manaus and Para."

These so-called Brazil nuts are well-known in the American markets and are highly esteemed for their oily almond-flavored interior. They are a luxury in some countries and an article of food in another. They are used either to obtain an oil or are eaten in the raw state or are otherwise prepared as an article of food. About the end of December the seeds are in the fit state to be eaten raw;



Courtesy the South American

NATIVES BUSY TAKING OFF BRAZIL NUT CARGO

The cargoes of nuts are brought down the small streams of North Brazil in canoes to the larger rivers, which are navigable by steamboats and which carry the nuts to market. The industry is an active, profitable and most important one in Brazil.



Courtesy the South American

UNLOADING BRAZIL NUTS

This shows the method of unloading the nuts by basket and depositing them on the river bank awaiting the arrival of the river steamers.

and they may be preserved for many months by storing them in a moderately dry place and out of reach of the hot sun or excessive moisture. The use of the seeds for procuring an oil is more extensive and important than is generally known. If they are kept dry the kernel soon easily separates from the hard shell of the seed. The seeds are then cracked with a small mallet or by means of machinery especially designed for this purpose without injuring the kernels. The sound kernels are next cleaned from every particle of shell and crushed for the purpose of obtaining the oil of which there is approximately 70 per cent. The oil obtained from the first pressing is of the best quality; it is clear and suitable for food and is sometimes used as a substitute for olive oil. It retains the taste of the kernel, which to some persons is very disagreeable. The oil is used also by watch makers and artists.

The bulk of the seeds coming into the United States are eaten. It has been estimated that about twenty per cent are shelled and used by confectioners for making various sorts of candied products. This latter use is rapidly increasing.

According to Mr. Carter the exports of Brazilian nuts from Para, Manaus, and Itacoatiara during the period from January 1st to June 30, 1915, amounted to 407,687 bushels. Of this total, 188,542 bushels were from Manaus, 38,117 bushels from Itacoatiara, and 181,028 bushels from Para. Manaus shipped 100,890 bushels to Europe and 87,652 to American ports, Itacoatiara 24,274 to

Europe and 13,843 to this side of the Atlantic, and the respective figures for Para were 87,496 and 93,532. The total exportation to Europe was 212,660, and to American ports, 195,027. The statistics of the Department of Commerce and Labor give the following amounts and values of the Brazil nuts imported into the United States from 1909 to 1914, inclusive:

| Year | Amounts | Value |
|----------------|------------|------------|
| 1909 (Bushels) | 407,719 | \$ 761,219 |
| 1910 " | 461,496 | 1,251,738 |
| 1911 " | 283,902 | 804,064 |
| 1912 (Pounds) | 21,539,508 | 1,092,671 |
| 1913 " | 11,933,445 | 668,534 |
| 1914 " | 20,423,497 | 1,075,907 |

Another interesting product of the Brazil-nut tree is the bark.



Courtesy the South American

PLACING BRAZIL NUTS IN THE PAIOES

These paioes are shelters built of palm leaves on the river banks, in which the nuts are protected from the hot sun and tropical rains pending the arrival of the river steamers.

The inner portion of the bark is rather thick, very fibrous and of a dark brown or reddish color indicating the presence of tannin. It contains tannin in commercial quantities, but it is rarely used for this purpose because the bark is too valuable for making oakum used so extensively in Brazil for calking vessels.

A CABLEGRAM from France received from Secretary P. S. Ridsdale, of the American Forestry Association, just before this magazine went to press announced that the French Government has accepted the offer of aid in reforesting France made by the Association. Mr. Ridsdale, after visiting the devastated areas, will return to Washington, sailing from Liverpool February 5th, on the first available boat. Plans for gathering the seed for France will be completed upon his return.

THE POSSIBILITIES OF FARM WOODLAND DEVELOPMENT UNDER THE SMITH-LEVER ACT

BY C. R. TILLOTSON

ACCORDING to estimates made by crop reporters of the Bureau of Crop Estimates, United States Department of Agriculture in December, 1917, approximately 83,000,000 cords of firewood were used on the farms of the United States in the year 1917. The total value of this in round figures was \$283,000,000. A

cordwood or other material as would be possible if they were properly cared for. It is apparent that even considered from the standpoint of a revenue producing crop only, farm woodlands are an asset of considerable national importance. The coal shortage experienced in several regions last winter has emphasized the fact that farm woodlands have a value other than that of being merely revenue producers. Many a farmer and community would have gone cold for a period last winter had it not been for cordwood cut from farm woodlands to meet the emergency of no coal. The same may perhaps be true next winter and then again at some future date. It is principally as a yearly crop, however, that wood deserves attention.

Wood produced in the farm woodlands is a farm crop and there is a continual need on the farm for it. As a crop it has attributes possessed to a like degree by no



A WHITE OAK STAND

These trees are 25 years old, 2 to 5-inch diameter, 30 feet high. The stand is in excellent shape for a thinning of 2,000 to 2,500 per acre. Sprouted low. Grazing has been practiced. Brighton, Livingston County, Michigan.

similar estimate made in December, 1916, showed about 82,000,000 cords used in 1916, valued at \$225,426,000. These figures represent only the value of cordwood used on the farm. They do not include the value of other products, such as posts and poles used on the farm nor the cordwood and other material sold from the farm woodlands. With these taken into account, it seems reasonable that the total value of products cut from farm woodlands during each of these two years must have been from \$400,000,000 to \$500,000,000. Probably more often than not, moreover, the woodland owner through ignorance of values received less for his woodland products than they are worth. For the most part also farm woodlands are in poor condition and not producing as much



ENGINE CUTTING WOOD

Saws whole trees up $\frac{1}{2}$ to 2 cords an hour. Santa Fe Springs, San Bernardino County, California.

other on the farm. It demands little care; will thrive on poor soil; naturally and continually regenerates itself, and is marketable at all seasons and at increasing values as it grows older and larger. In some regions wood is still the main crop of the farm and furnishes employment for

man and beast alike during winter months. The woodland serves as a protection to farm buildings, livestock, and crops and increases the sale value of the farm. These things entitle it to consideration at the hands of agriculturists and all others interested in better farming and better farm conditions in general.

A great and growing interest of late years been taken by the individual states and the nation in rural affairs. Through their agricultural colleges and experiment stations the states have been wrestling with local agricultural problems and sending useful information broadcast to farmers within their borders; the national government has also been helping agricultural affairs largely through the organization of the United States Department of Agriculture, but also through giving direct aid to State Agricultural Colleges in the form of Federal appropriations. A number of acts for this purpose have been passed from time to time, but the one known as the Smith-Lever Act, passed May 8, 1914, is proving to be more far-reaching in its effect than any of the others.

This bill provides for cooperative agricultural extension work between land grant agricultural colleges in the states and the United States Department of Agriculture, this work to consist of the giving of instruction and practical demonstrations to persons not attending or resident in these colleges

and imparting to such persons information on these subjects through field demonstrations, publications, and otherwise. The work must be carried on in a manner mutually agreed upon by the Secretary of Agriculture and the colleges which receive the benefit of the act.

To pay the expenses of this work, \$480,000 is to be appropriated yearly from Federal funds; \$10,000 of this will be distributed to each state. An additional \$600,000, or a total of \$1,080,000, was appropriated for the fiscal year July 1, 1915, to June 30, 1916. For each year thereafter for seven years, the Act provides for an appropriation exceeding by \$500,000 that of the preceding year. Thereafter, there will be permanently appropriated each year in addition to the sum of \$480,000 the sum of \$4,100,000 to carry on this work. For the fiscal year July 1, 1918, to June 30, 1919, there will be appropriated \$2,580,000. To receive its due quota of the money ap-

propriated in any one year, the State must provide an equal amount either through an appropriation by the State Legislature or through "state, county, college, local authority, or individual contributions from within the State."

As stated in the Yearbook of the Department of Agriculture* for 1914, this is one of the most striking educational measures ever adopted by any government. The machinery for putting it into effect is already well developed, every State in the Union has agreed to its provisions, and already the State Agricultural Colleges and the United States Department of Agriculture are getting in closer touch with the agricultural population than has hitherto been possible. Through the employment at these colleges of experts in different lines, such as agronomy, animal husbandry, dairying, etc., many lines of work are already being carried on under the provisions of this law. The possibilities in this respect have been made more effective through the system of county agents in most States. These men, with headquarters usually at

the county seat, are in the employ of the Agricultural College. It is their business to assist farmers in agricultural matters. They are almost continually traveling from farm to farm in their counties and carrying information to the farmers. All of each State's activities supported by this Act are under the control of



PRODUCTS OF THE WOODLOT

A load of hackberry poles on public square for sale. They bring \$2.50 per load at Gallatin, Tennessee.

the State Extension Director, who is also connected with the College, and before any projects for which the use of Smith-Lever funds are contemplated can be initiated, they must receive both his approval and that of the States Relation Service of the United States Department of Agriculture.

The significance of this bill and the organization of county agents which has arisen out of it to those interested in forestry and particularly in farm woodlands must be apparent. The importance of farm woodlands to their owners has already been pointed out. Why, then, should not they be given their due share of attention under the provisions of this law? The average woodland owner knows less about the handling and selling of his timber than about any other farm crop. The present big demand for cordwood is doubtless resulting in the needless slashing of many farm woodlands and will

* Report of the Secretary, page 5, Yearbook of the Dept. of Agr., 1914.

destroy their future usefulness. Through expert advice upon how and what timber to cut from farm woodlands, great quantities of cordwood in the aggregate can be secured without damaging their productive capacity. The woodland lends itself very well to demonstrations of various kinds such as improvement cuttings, estimating timber, planting to secure windbreaks or better stands, efficient cutting and marketing of products, preservative treatment of fence posts, and a number of others. There is no question of the legality of such work under the terms of the bill. It has already had the approval of the States Relations Service of the United States Department of Agriculture, and Extension Directors in several States. There is apparently no reason why the farm woodland should not come in for attention and a great many reasons why it should. All that now needs to be done by those interested in this phase of agriculture is to impress upon the State Extension Director the immediate necessity for initiating such work, and assisting him to do it.

The best means of giving such work permanency and effectiveness appears to be for the agricultural colleges from which the extension work is directed to attach to their staffs for this particular purpose an expert in forestry. His position would be similar to that of an expert in dairying, for instance, who is attached for the purpose of improving the dairying conditions throughout the State. The forestry expert would be able to take advantage of the system of county agents and through them reach more people than through any plan in which he would have to work alone. There is little question but that through assistance given in the sale of woodlands products alone he would each year save to woodland owners in the State many times his salary. In teaching them how to care for their woodlands he would be making provision for future supplies of farm timber

and increasing the value of the farms. His duties would not interfere with those of the State Forester, and in most cases at least he would be welcomed and given as much assistance as possible by the State Forester. In several States, such experts have already been employed by the agricultural college.

Where in the opinion of the State Extension Director conditions do not at present warrant the employment of such a man, it may still be possible for the State Forest Service to carry on such work in co-operation with the State Extension Service of the College. At least two State foresters are already doing so with entirely satisfactory results. If a State Forester wishes to conduct work in line with provisions of the Smith-Lever Act and can allot for that purpose a certain amount of his appropriation to a project which will come under the direction of the State Extension Director at the college, there is little doubt that many of these directors would be willing to submit such a project to the United States Department of Agriculture for approval. On the strength of funds allotted by the State Forester for this purpose, the Extension Director would be in a position to request an equal amount of Federal Smith-Lever money to meet



OPEN WOODLOT IN GOOD CONDITION

A stand of sugar maple, walnut, coffee tree, ash, red oak and hickory at Prospect, Marion County, Ohio.

it providing, of course, the States' entire quota were not already utilized in other extension projects. As each State's quota of this Federal money will continue to increase yearly until July, 1922, State Foresters have a splendid opportunity to take advantage of this Smith-Lever Act. They should lose no time in getting in touch with the Extension Director of their State in order to work out with him a project which will conform with the provisions of the law, be acceptable to both, and be effective in giving the woodlands under this law the consideration which their importance in the general farm economy fully justifies.

INTRODUCE YOURSELF TO AN AX!

"THE ax is intimately associated with the history of the world and has played a prominent part in all stages of its progress," says Mercer P. Moseley, Assistant Federal Fuel Administrator for the State of New York.

"In Biblical lore and historical age its record is one of absorbing interest. Elijah employed it as an instrumentality to strengthen the early Christian faith when he performed the miracle of its rising from the depths of the Jordan. Bryant's 'Forest Hymn' makes illuminating reference in the lines 'Ere man learned to hew the shaft or lay the architrave.' Its function runs the manifold gamut from murder to peaceful pursuit. Under its stroke the heads of both kings and commoner have

rolled in the sawdust in the days when the mob reveled in the sight of blood. It was the general weapon of war in ages past. Gladstone and Lincoln employed it for purposes of healthful exercise. Boone and Crockett reckoned its indispensability with that of the rifle. Today our engineers depend upon it to throw bridges across streams, to erect hurried protection for front-line fighters and to advance the arts of war. And those of us at home can and should use the ax to split dead wood for live fires and thus save coal. This modest and non-spectacular performance is a distinctly patriotic and helpful contribution to the success of our arms across the seas as well as to the comfort of those left behind. Introduce yourself to an ax."

DIGEST OF OPINIONS ON FORESTRY

WILL YOU NOT CO-OPERATE WITH US BY IMPRESSING UPON THE EDITOR OF YOUR NEWSPAPER THE IMPORTANCE OF FORESTRY? WRITE TO YOUR NEWSPAPER

MEMORIAL TREES, the forest fire in Minnesota, the work of the Boy Scouts in locating walnut trees and the saving of paper are subjects discussed by the newspapers of recent issue. In the Memorial Tree and paper saving campaign the American Forestry Association has a big part and with the co-operation of the members of the association will have a still bigger part. Every member should further the suggestion that Memorial Trees be planted for the sailors and soldiers who fought in the war by writing his newspaper and placing the suggestion before committees having memorials in charge. Each member should constitute himself a committee of one to forward to the secretary marked copies of papers mentioning this subject in any way.

Plans for memorials are now being discussed everywhere. The *Boston Post* devoted a page to memorial suggestions leading the article with a letter from the American Forestry Association suggesting that trees be considered in whatever was done. The *Pittsburgh Gazette-Times* in an editorial tells of the association's secretary going to France to offer aid to reforesting that country and of the importance of that work. The *Constitution* of Atlanta takes up the Memorial Tree idea editorially and says the suggestion is "both commendable and feasible." The *Dayton News* points out what fine memorials trees will make and adds that their great value to bird life should be taken into account. "Any plan that will result in more tree planting," says the *Milwaukee Journal*, "should have the most careful consideration." The *New York Sun* says editorially: "No more appropriate, beautiful, or sensible memorial to the men who have fallen in the war could be devised than plantations of trees." The *New York Mail* calls the memorial tree idea one of "excellent possibilities for a great national work."

"Tree planting is at once a simple, thoughtful, artistic and durable means of raising a memorial. It is being urged by the American Forestry Association," says the *Chicago Tribune*, "and because it is so simple of accomplishment and so enduring it should receive immediate and active support everywhere in the United States."

"There would seem to be a quality all but universal in its appeal in the proposal, which to a considerable degree has been put into practice to plant trees along the great highways," says the *Cincinnati Enquirer*, while the *Baltimore Star* takes this view: "The public is becoming sympathetically attuned to the idea of having memorial trees planted for soldiers and sailors." The suggestion for permanent Community Christmas Trees is meeting with hearty indorsement and Earl Godwin, writing in the *Washington Times*, says: "There is a good

idea. Here is a fine opportunity for a 'Victory Grove' that would be one of the finest tributes to our heroes no matter what may be done in bronze or stone." As to the value of memorial tree planting the *Tifton, Georgia, Gazette* says, "that is a splendid suggestion from the *Savannah News*."

"A Spectator" who witnessed the planting of Memorial Trees for four members of the Church of the Holy Innocents, at Tacony, writes in the *Public Ledger*, "the exercises were marked by great reverence and solemnity." "The Listener" in the *Boston Transcript* devotes comment to memorial tree planting and the *Transcript* also calls attention to the request of the Society for the Protection of Native Plants that less laurel be used. The *New York Evening World* prints the story of the laurel wreath sent to President Wilson by the General Federation of Women's Clubs which is urging it as the national flower. The *Post Dispatch* of St. Louis in an editorial asserts there are many available locations for tree planting there and continues, "the groves were God's first temples, and as a living shrine for liberty the twentieth century can offer nothing better." The *Public Ledger* says, "there will be complete unanimity as to the wisdom of formal tree planting in parks and on highways." The country is impatient, the *Public Ledger* adds, with the average memorial that sprang up after the Civil War.

The drain upon the sources of the timber supply of Great Britain are pointed out in a long article in the *Christian Science Monitor* and the *St. Nicholas* treats of what family the peanut really belongs while the *Youth's Companion* tells its readers about the wood needed in making an aeroplane propeller. The *Nashville Banner* carries an article by Latimer J. Wilson on the "aeroplane forest patrol" which subject is attracting attention all over the country. The *New York Herald* had a good story on the offer of the American Forestry Association to help in reforesting France and another on the need of replanting black walnuts.

In an article on "Autumn's Chemistry" the *Portland Oregonian* touches upon the wonders of Nature at the closing of the year. The *Cleveland Plain Dealer* carries a feature story on the quick work in pine tree cutting to make ships at Galveston. The *Washington Star* prints the letter to the Boy Scouts from Secretary of War Baker praising that organization for its work in locating black walnut. The *Washington Times* has printed many articles on memorial trees and the news associations, as could be seen from the page of headlines printed in the December number, have co-operated in a very fine way. The *Times* of Marietta comments upon the fact that walnut trees are disappearing and says, "for every food tree cut

down six should be planted." The newspapers are finding many good stories in the office of the state or city forester since the American Forestry Association started the campaign for memorial trees.

The Dallas *News* is giving more and more space to the value of forestry, having carried a story on "trees and rainfall," by Dr. Joseph L. Cline, the weather observer there, and another on the pecan as a valuable shade tree. "The destruction of timber in the last half century has been little short of criminal," says the *Evening Journal* of Dallas in suggesting more attention be paid in the schools "to the resources which Providence has set aside." The Detroit *Free Press* calls attention to the shortage of several valuable woods in an editorial and reminds us that Ruskin called the tree the link between earth and man. The Trenton (N. J.) *Times* has had two editorials on forestry and several news stories.

The Charlotte *Observer* "will not despair," it says, although "it has hammered on the cross tie conservation idea for years past." The *Observer* goes on to point out the fuel value in the cross ties being burned along railroad rights of way every year. From cross ties to poetry may be a long cry but the newspapers seem ever ready to print anything touching the beauties of Nature and there is always something about trees in that subject. The Arkansas *Gazette* has a poem, "Song of the Pines," and John D. Wells, the sweet singer of the Buffalo *News*, pens of the "First Frost of Fall," from which we take this verse:

The first frost fell last night! It glazed the trees.
The pavements, too, it painted snowy white;
The roofs and walks, as Fancy seemed to please,
It fell upon and coated over night;
The town was white, with autumn's hoary sign,
And here and there in all the world of man
It touched a heart and turned, as it turned mine,
To nutting days in Mills' Grove again.

Once more rally to the call, members of the American Forestry Association. Every tree beckons to you to become a friend—a friend of action instead of an admirer only. Their interests are our interests, heed the call.

ROOSEVELT

'Tis not alone in Flanders field
The poppies grow;
To him who spent his life for us
Comes Death's fell blow,
Our greatest Soldier of the Right
Is stricken low.

More dauntless spirit never beat
In any breast,
More valiant sword was never drawn
On any quest,
Now wept by all who love the land,
He sinks to rest.

We vow that we shall wage his fight
Upon the foe,
We vow that we shall keep his faith
Because we know

'Tis not alone in Flanders field
The poppies grow.

—McLanburgh Wilson, in the *New York Sun*.

TO HELP REFOREST FRANCE

CARRYING a sack of Douglas fir seed, Percival S. Ridsdale, secretary of the American Forestry Association, has arrived in France to offer the help of America in reforesting the 1,500,000 acres of woodland wiped out by the war in the north and east of that country.

The seed carried by Mr. Ridsdale will grow 50,000 trees, valued at about a million dollars, although the sack in which he carried it is small enough to be fitted into a traveling bag. The Douglas fir seed has been asked by the French Government for experimental planting, as it is thought to be suitable for French soil and climatic conditions.

"This vast acreage of forest was used in trench, road and barracks building or else was blasted to pieces by shells," Mr. Ridsdale explained. "Almost a million



Harris and Ewing

A SMALL PACKAGE WITH A BIG VALUE

Taken just before he sailed for France, this picture shows Mr. Ridsdale holding the bag of Douglas Fir Seed which he carried with him. It held 50,000 seeds—all that could be obtained in this country at this time.

French people were dependent upon these forests for their livelihood six months in the year and the French Government faces a great economic problem in providing them with other resources until the forests are restored.

"In collecting the seed wanted by France the members of our association, the forestry departments of the various States, the Boy Scouts and other organizations will be called upon to help," he said. "A million and a quarter acres of forest in the north and east of France have been practically wiped out during the war and must be replaced."

Forestry for Boys and Girls

by E. C. Cheyney

THE PINE WOODS FOLKS

SQUEAKY CHIPMUNK LEARNS SOMETHING ABOUT PINE SEEDS



SQUEAKY Chipmunk was darting nervously around under the blueberry bushes near his hole beneath the old rotten log. He was in a great hurry because he had heard a strange sound and he always made it his business to find out all about every sound that he heard. His scanty little tail stood straight up as he bobbed from stump to stone and from stone to fallen tree.

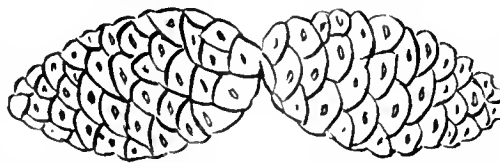
"That's very strange," he said, stopping a moment on his old familiar log to catch his breath, "I heard a distinct bump, and it was not so very far from here either."

With that he scurried off to have a peak behind an old pine knot that he might have overlooked. He had just jumped to the top of the old pine knot when there was a tremendous thump behind him that sent him scurrying into the brush in a panic. But he was back again almost instantly. No matter how badly he is scared his curiosity is so great that he is just obliged to come right back to see what it was that scared him. No sooner had he scampered back to the old pine knot than his bright little eyes discovered the shiny new pine cone lying less than two feet away.

Now Squeaky has a terrible temper and nothing makes him quite so angry as to have been badly scared when there was no real cause for it. His fur bristled up, he pounded the old knot with his tiny hind feet, and squeaked his very maddest. His little tail quivered and jerked with every squeak, and the more he squeaked the angrier he seemed to get. At first he squeaked at the pine cone, but he soon stopped that and turned his attention to the top of the big Norway tree for he knew perfectly well why that cone had fallen.

Sure enough a red form glided out on the end of a limb high up on the great Norway, first over a big
les, at the end
down came an
It came so close
ducked in spite
he immediately recovered with an angry little chatter and squeaked louder than ever. Indeed he squeaked so loud that he was almost afraid of himself.

A scolding chatter came in answer from the top of the pine tree, a chatter so harsh that it was almost a bark. "Don't you touch those cones," Chatter Box, the red squirrel, called down angrily. "Don't you dare touch them. I cut them down and they are mine."



"I know you cut them down," snapped Squeaky, who could be as saucy as anyone when Chatter Box was away up in the top of a tree, "and you be careful where you drop them. You almost hit me that time and if any of them fall in my yard I'll take every one of them."

"You try it," snapped Chatter Box, "and I'll eat some of your children."

This scared Squeaky a little, but it would not have stopped him from taking one of the cones if he had not wanted to see what Chatter Box was going to do with them. He was very young himself and the few pine seed he had stored the winter before had all spoiled on him. He knew that Chatter Box was an authority on pine seed and he wanted to see what he would do with them. He climbed a stub on the old log over his house and watched.

Chatter Box came tearing down the tall Norway in a great hurry, scattering loose pieces of bark in all directions. He grabbed up the cone nearest to Squeaky and carried it to the top of the old stump. He picked a nice flat spot, curved his tail his back, and, with fixed on Squeaky, he idly around in his cone scales and dig under them. Squeaky

"Yes, he was eating

"I thought it was too
Squeaky called in
"It is too
to eat any of
ter Box retor
taste pretty
he added
he picked
cone and car
onto the

"Have you
very many of them this year?" Squeaky asked, ignoring the insult, for he had not yet found out what he wanted to know.

"Stored them," Chatter Box exclaimed in contempt, "I should say not. They will not be ripe enough to store for two weeks yet."

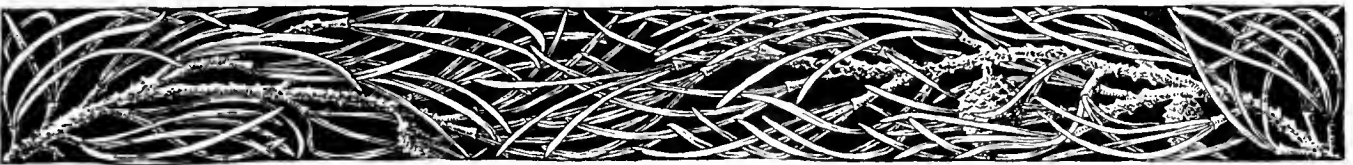
That was what Squeaky wanted to know. That was the reason his had shriveled up the year before. He had stored them too early. So you could eat them for two weeks before you could store them, that was worth knowing, too. The next thing was to get some to eat right now, for it had made him very hungry to see the other fellow eating them right before his eyes. He was in hopes that Chatter Box had cut down more than he could eat and would leave some on the ground. He was afraid to try to climb those tall trees and try to cut them down himself. He counted all the cones he could see on the ground and waited patiently. But Chatter Box slowly picked up one after



them."
early to eat those,"
neighborly fashion.

early for you
mine," Chat-
ted, "but they
good to me,"
teasingly as
up another
ried it up
stump.

stored up



another, the pile of green cone scales on the top of the stump grew high, and still he did not show any signs of stopping. At last Chatter Box jumped down to get the next to the last one, and Squeaky could not stand it any longer. When Chatter Box started back for the stump Squeaky made one grand dive for the remaining cone, grabbed it and ran for his life.

Chatter Box saw him and gave chase. It was a close race, but Squeaky won out to his hole, bumped into Mrs. Squeaky who was waiting for him in the doorway, and they both rolled down the passageway together.

Safe inside their snug little home with the cone, they proceeded to shell out the seed while Squeaky told his little wife all he had learned, and they both laughed at Chatter Box who was still scolding out on the old rotten log. (To be continued)

THE HARMLESS FIRE-BUG

The lightning bug flew through the woods,
And flashed his little lamp;
"This is the thing to use," says he,
"The woods are very damp."

He chuckled to himself and said,
"The woods will soon be drier,
Then this is still the thing to use,
So's not to start a fire.

"So rain or shine or wind or calm,
My little lamp's the best;
No man-made lantern, match or flash
Can ever stand the test."

Problems For Boy Scouts

1. What conifers lose their needles every winter?
2. Does the snow lie deeper in the woods or in the open?

(To be answered in the next issue)

GATHER WALNUTS FOR PLANTING

BLACK walnut is of the most profitable woodland and pasture trees. It is rapidly becoming scarce on account of the important part it has played in the war, and the strong demand for the wood for cabinet material, caskets, musical instruments, furniture, etc.

The nuts for planting should be selected, so far as possible, from vigorous trees producing good-sized nuts in abundance. If squirrels and hogs are not troublesome, the nuts may be planted this fall, putting two nuts in a hole and covering with about four inches of soil well firmed. In many places the safest method is probably to keep the nuts over winter and plant them in the spring. For this purpose a pit, dug eight to twelve inches deep in a well-drained, cool location, is a desirable storage place. A layer of nuts, two nuts deep, is covered with an inch of sand, and so on until all the nuts are stored, after which soil should be mounded over the pit to shed excess moisture. Nuts mixed with sand will keep quite satisfactorily in a cool cellar. A bushel of walnuts contains from 1,100 to 1,400, depending upon the size of the nuts, or enough to plant an acre, using two nuts in each hole, spacing the latter three feet apart each way.

THE TIMBER CENSUS IN THE NORTH-EASTERN STATES

From an address by A. B. Recknagel, at the Annual Meeting of the Society of American Foresters, December 27, 1918.

SHORTLY before the Germans launched their drive on the vernal equinox, which, as far as they were concerned, ended in a winter solstice known as an "armistice," certain members of the War Committee of the Society of American Foresters foregathered in the New York office of R. S. Kellogg and planned another drive which, it is hoped, will result far more favorably.

The objective was nothing less than a timber census of the Northeastern States. Statistics on the *consumption* of forest products we have—excellent statistics—but we need to know with equal accuracy as to the existing *supplies* of timber so that we may balance supply and demand through the adoption of a proper forest policy. The meeting was held on April 25, 1918. Those present represented the States of Maine and New York and a plan of campaign was developed for securing the desired data. The chairman of the War Committee, Prof. Toumey of Yale, was unable to attend, but shouldered the burdens of securing the needed data for the States of Massachusetts, Rhode Island, Connecticut, New Hampshire and Vermont by enlisting the co-operation of various organizations in these States.

The campaign developed rapidly and met with an unexpected degree of support on the part of timberland owners. Forms for reporting estimates were prepared and sent out in each State by some recognized agency. In New York Mr. C. R. Pettis, Superintendent of State Forests sent out, under date of May 15, a strong letter, stressing the urgent need for reliable information about merchantable standing timber.

What followed up to the ending of the war, has been told by Prof. Toumey in the November issue of the *Journal of Forestry*, issued by the Society of American Foresters.

On the day following the signing of the armistice the "Census Makers" gathered in Boston and, with the joyous shouts of the peace revel in their ears, decided that despite the end of the war the valuable data accumulated in the census should not be lost but that the work should be carried to completion. It was left to each State to compile the data and to publish them through whatever agency in the State seemed most appropriate. Then the Forest Service will probably publish a summary for the entire Northeastern region. The Reconstruction Conference of the National Lumber Manufacturers' Association in Chicago on November 23, 1918, passed a strong resolution endorsing the plan.

So the matter stands at present. Conceived as a piece of war work the timber census gives promise of filling a peace need as well.

FALL or winter pruning of grape vines may be done at any time during mild weather from November to March, while the vines are in a dormant condition.

THE SANDPIPERS

(FAMILY SCOLOPACIDAE)

BY A. A. ALLEN, PH.D.

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

WHEN the waters in our lakes and ponds recede during late summer and leave exposed great areas of soft mud, they would become very unattractive were it not for the flocks of graceful little birds that assemble upon them. With jerking heads or tilting tails they trot along the soft oozy shore in search of the larvae that lie concealed in the mud. These are the sandpipers. There are tiny ones, smaller than spar-

phalaropes, lobed toes, but they are all very similar in general appearance.

There are about 100 species of sandpipers, most of them being confined, except on their migrations, to the northern parts of the Northern Hemisphere, many of them nesting within the Arctic Circle. Forty-five are found in North America, some of them confined to the West, some to the East, but the majority nest in the far north and follow in their migrations the routes of abundant food. Thus they are more common along the sea coast than inland.

They are great travellers, these sandpipers, perhaps the greatest of all, some of them traversing the entire length of both continents in their migrations. The majority of species spend the summer on the barren grounds of the far north and, in the fall, though some of them stop on our Gulf Coast, many speed their way across the Caribbean to northern South America and some continue down the coast even to Chile and Patagonia. When they leave their summer homes they have stored up great layers of fat, but when they reach their winter quarters, the majority have grown thin. Particularly is this true of those that follow the route of the golden plover on the long flight from Nova Scotia to Venezuela or from Alaska to the Hawaii



"SANDPEEPS" IN FLIGHT

Least and Semipalmated Sandpipers showing the characteristic pointed wings of the family.

rows, and there are larger ones as big as pigeons, sometimes in separate flocks, sometimes all mingled together. They are brownish or gray above and white below, with slender legs and long slender bills, and except for their size, all look much alike. It takes a sharp eye to distinguish the different species when they have assumed their fall plumages. But it is in this plumage that we see the most of them for on their way north in the spring, the waters are high, mud flats are scarce, and they are in a hurry to get to their nesting grounds. In their breeding plumage many of the species are strikingly marked with black or chestnut and are easily distinguished from one another, but in the fall they constitute a post-graduate course in bird study that appeals to those who have passed through the warblers and the sparrows and the flycatchers and are ready for more difficult problems.

Together with the plovers, the avocets and stilts, the turnstones, and the phalaropes, the sandpipers make up the great group of shore-birds. The plovers have much shorter bills than the sandpipers, the avocets and stilts, much longer legs, the turnstones squarish bills, and the



THEY MAKE THE SHORES ATTRACTIVE

Stilt Sandpipers are feeding in a close flock at the right; a dowitcher, yellow legs and Semipalmated Sandpipers are at the left, black terns are in the background.

Islands without a single stop. Twenty-five hundred miles in a single flight seems almost incredible, but such is the accepted belief today with regard to the plover and other shorebirds that accompany it. Indeed they have been seen passing over the Lesser Antilles as though untired and continuing on to the main land of



HIDING IN THE OPEN

Pectoral Sandpipers crouch on the shore to escape detection.

South America though good stopping places were plentiful. When instinct compels birds to make such a trip, it is little wonder that it carries some of them on southward far beyond the bounds of reason and good sense, even to Cape Horn, a distance of perhaps 9,000 miles from their nesting grounds.

In former years all of these shorebirds were considered game birds and were shot in such numbers that some of the species were nearly exterminated. This was possible because they ordinarily fly in close flocks so that many can be killed at a single discharge of the gun. Now, through the Migratory Bird Treaty with Great Britain, they have passed under Federal jurisdiction and all save a few species are given protection. Of all the shore-birds, only the yellow legs, the Wilson's snipe, the woodcock, and the black-bellied and golden plovers remain on the game list for which there is an open season.

The commonest species of sandpiper is the spotted sandpiper, "tip-up" or "teeter-tail" as it is variously called. In summer it is found along almost every stream and lake from Northwestern Alaska to Louisiana, and in winter, from Louisiana to Southern Brazil. It can be distinguished from the other sandpipers of its size, about that of a sparrow, by the conspicuous spots on its underparts. In the fall, however, these are lost and it would be hard to identify were it not for its constant teetering. Several other species, and especially the solitary sandpiper, jerk their heads when they walk, but the spotted teeters its tail or its whole body as

though it had difficulty in balancing on its slender legs. It flies with a peculiar hovering movement of its wings which show a narrow gray line down the middle.

The solitary sandpiper is perhaps the next most common species inland. Although it probably does not nest in the United States, it is very late in moving northward in the spring and early in returning in the fall so that except for the month of June, it is nearly as common in most places as the spotted. It is somewhat larger and darker than the spotted sandpiper and lacks the spots on its underparts and shows conspicuous white outer tail feathers when it flies. It is the one sandpiper that seems to prefer woodland pools and it ventures among the trees quite readily.

The yellowlegs are similar in color pattern to the solitary sandpiper, but are grayer and have whiter tails. There are two species, the greater and the lesser which are almost identical except for size. Indeed when there

are no other birds about so that the size can be correctly judged, it is sometimes impossible to tell which species is under observation. When they take flight, their notes will often announce them for the smaller species never gives but two notes together, "wheu - wheu," while the greater gives three or more in succession, "wheu, wheu-wheu-wheu-wheu, wheu, wheu-wheu." The yellowlegs have withstood the onslaught of the gunners better than any of the other species and are still



OCTOBER MORN

A lesser Yellow Legs feeding in the early morning.



THE WHITEST OF THE SANDPIPERS—THE SANDERLING

It is likewise the only Sandpiper with but three toes. It prefers the drier sandier shores.

fairly abundant in suitable places during May and again from August to November. Indeed they have been much more successful than the knot, the willet, and the Bartramian sandpipers.

The knot which is about the size of the yellowlegs, but with a shorter bill and legs, formerly occurred in

close them. They have a striking call during the breeding season like the syllables "chr-r-r-r-ee-e-e-e-oo-o-o-o-oo," given with a rising and falling inflection. Indeed most of the shore-birds have striking whistles and, as they are quite easily imitated and decoy to the imitation, it has made their extermination all the more possible.



A "SANDPEEP" ON THE SHORE

The Least and Semipalmated are the smallest of the Sandpipers. This is the Least.

flocks of thousands along the coast, but has been so decimated that it can no longer be considered a game bird. It has the unfortunate habit of flying in very dense flocks so that many could be killed at a single shot. In the spring the underparts of the knot are a beautiful rufous, giving it the name of robin snipe.

The willet is considerably larger and has striking black and white markings in its wings. It was formerly found along the coast as far north as Nova Scotia, but is now rare north of Virginia.

The Bartramian sandpiper or upland plover as it is better known, is about the size of the yellowlegs, but is brown instead of gray and has a shorter bill. It is more a bird of the interior than the other sandpipers and was formerly very abundant throughout the grassy plains and pastures of the Mississippi Valley. It is ordinarily a shy bird, but will permit one driving or on horseback to approach very close. Market hunters took advantage of this in former

years and nearly exterminated the species. In a few places, however, they are still firmly established and now that they are protected by the Federal Law should increase. Like the willet they always stretch their wings straight up over their backs when they alight and then

broad band of black across the belly, but in the fall it becomes entirely gray above and white below. It can be distinguished from the others of its size by its slightly decurved bill. The remaining sandpipers are too numerous for full description, but the white-rumped is very similar to the red-backed in the fall, the Baird's that

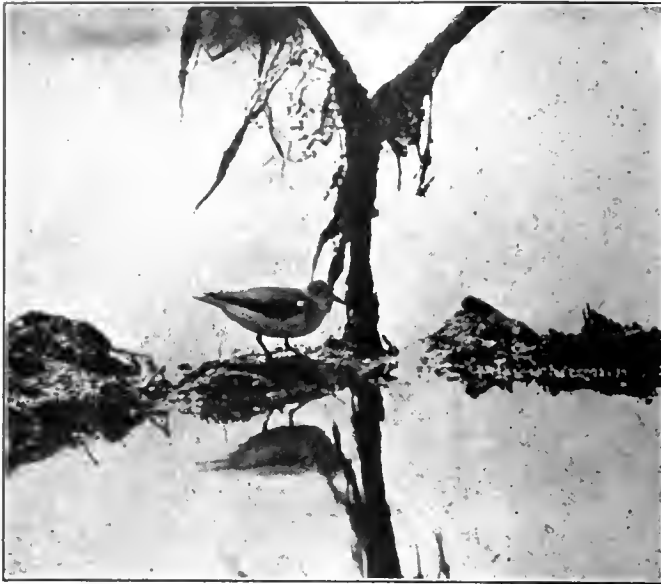


ANOTHER "SANDPEEP"

But this time a Semipalmated Sandpiper—it has a somewhat heavier bill and is somewhat grayer than the Least.

resembles a small gray pectoral, and the stilt sandpiper with dark legs that resembles the yellowlegs might be mentioned. Then there are other sandpipers that have departed from the type of those thus far mentioned. The curlews, for example, are considerably larger and

browner and have strongly decurved bills. Like the willet and upland plover, the curlews were formerly abundant, but are now scarce. Indeed, one species, the eskimo curlew, is believed to be extinct. The godwits have slightly upcurved bills and the dowitcher, Wilson's snipe and woodcock have exceedingly long probe-like bills. What has been said regarding the curlews applies also to the godwits, for while the marbled godwit is



NO SPOTS ON THIS

Fall styles with the spotted Sandpipers permit of no polkadots. A September Spotted Sandpiper.

still fairly plentiful in the Northwest, the Hudsonian godwit is one of the rarest shore-birds.

The dowitcher is more like the other sandpipers and often associates with them on the open mud flats, but the Wilson's snipe prefers the grassy marshes and seldom ventures out on the bare flats except early in the morning and at dusk. The Wilson's snipe is a better game bird than the other small sandpipers because of its habits. It sometimes travels in flocks, but they scatter when feeding and do not get up together nor afford a "pot shot." They ordinarily escape detection until they jump with a somewhat startling "kick" or "bleat" and quickly get off on a zigzag course that puzzles the hunter.

Even more aberrant and the best game bird of them all, is the woodcock. It never ventures out into the open except after dark, but spends the day usually in alder thickets, though sometimes at a considerable distance from water. Because of the nature of its haunts, it is a difficult target for the hunter. It has, however, the unfortunate habit of never flying very far and allowing itself to be flushed and shot at time and again. Once in its winter quarters in the South, a bird remains in the same thickets until time to move northward again. Because of this, in many places hunters with dogs have been able to exterminate nearly all the birds wintering in some localities. This has resulted in woodcock becoming extremely scarce in most places.

The woodcock is one of the most protectively colored

birds that we have and on the nest it frequently relies entirely upon its coloration and will allow itself to be touched while incubating. It is said of the European woodcock that when it is frequently disturbed with its young on its feeding grounds it will remove them to some upland thicket for the day and bring them back to the feeding ground at night, carrying them between its thighs. Both the snipe and the woodcock have flexible bills and the tip of the upper mandible can be moved separately from the rest of the bill. This permits them to seize the worms or grubs which they find by probing in the soft soil. The tips of their bills are filled with sensory pits covered with a soft membrane which enables them to locate their food.

With the exception of one species, all of our sandpipers nest on the ground. The exception is the solitary sandpiper, which, so far as is known, utilizes the old nests of other birds like the robin and grackle, sometimes at a considerable distance above ground and away from the water. All sandpipers lay three or four eggs, very large for the size of the bird, which are sharply tapered so that they will fit together like the pieces of a pie. Other-



A SIMPLE LITTLE HOME ON THE SHORE

Sandpipers do not build elaborate nests but merely line a depression with a few straws. They lay large pointed eggs that fit together like the pieces of a pie. This is the nest of a Spotted Sandpiper.

wise the old bird would be unable to cover them. They are usually buff or tan in ground color, or with some species greenish, heavily spotted with black or brown.

Young sandpipers, when hatched, are covered with down, often of a striped pattern, and are able to run about and follow their parents or even swim across streams. The first plumage is similar to that of the adults in the fall and in the spring all molt into the

breeding plumage. If there is a bright plumage, females don it as well as the males. Indeed, among the phalaropes which are closely allied to the sandpipers, the females are brighter than the males. It is interesting

and fly larvae and a few of them frequent the uplands and catch grasshoppers and other destructive insects. On the whole, however, they commend themselves to us more because of their graceful appearance and charming



HOME AGAIN

The Spotted Sandpiper returns to its nest and inspects it closely to see that all is well before taking its place upon the eggs.



THERE'S NO PLACE LIKE HOME

For keeping a Sandpiper busy. She has only four eggs, but they are so large that she covers them with difficulty.

to note that with them the males are left to incubate the eggs and care for the young while the females assume no responsibilities after laying the eggs.

The food of the sandpipers includes many mosquito

ways. Our shores and mud flats would be desolate indeed with no birds to enliven them and most people are glad to see all of the smaller species removed from the game list.

THE meeting of the newly organized Tennessee Forestry Association, which was to have been held in December, has been postponed to some time in January. It is proposed that the By-laws and Constitution shall be broad enough to include the interests of the lumbermen, timber owners and farmers, as well as all those interested generally in the knowledge of tree growth. Conditions in Tennessee promise bright prospects for a splendid working forestry organization in the state.

ONE of the principal markets for American lumber will be found in Italy, according to a special cable to the Italian-American News Bureau. Reconstruction work in the recently invaded territory to the northeast of Venice is already making large demands for building material, and plans for building projects contemplate the expenditure of millions of lire by the Italian government.

AS this magazine goes to press, comes the first acknowledgment from overseas of the Christmas boxes sent the boys by the Welfare Committee for Lumbermen and Foresters in War Service—From R. Aaronson, of the Eighth Company, Twentieth Engineers. "Accept my kindest wishes for the New Year. Thanks very much for the package. It sure makes the fellows feel good to know that the folks back home are thinking of us."

THE building of wooden ships is likely to continue for years to come, according to reports from the various ship yards throughout the country which are constructing ships for the Emergency Fleet Corporation, and have completed only 50 per cent of their contracts.

PLANT WALNUT TREES

PRUNING FOR PROFIT

ARE YOU RAISING FRUIT OR WOOD?

BY WILL C. BARNES

THE overland train slipped into an obscure siding on the edge of a little town in the fruit belt of eastern Kansas. On the platform of the observation car, several travelers watched a man at work in a nearby orchard pruning apple trees; "dehorning 'em" a western cattle man called it.

Naturally the conversation drifted into the subject of pruning. One of the party, a Boston merchant, remarked that, until recently he had the idea that pruning was a "carpenters job" pure and simple. "I know better now," he explained, "thanks to some rather practical

lessons received while on this last trip to the Pacific coast." Some one pressed him for particulars. He lighted a fresh cigar and settled back in his chair.

"For fifteen years," he began, "I have been the proud possessor of a twenty acre orange grove in southern California. During all these years I have seen it only twice, but have been giving it 'absent treatment' through various alleged 'orange grove experts,' the last being a

man whose main qualifications for the job of caring for it, were his absolute integrity, and ability to distinguish between his own and his employers money, and an economical nature that Harry Lauder himself would envy. During the first six or seven years of ownership, I went through the whole gamut of experience in 'hiring and firing' a genial lot of pirates and spendthrifts, whose one ambition seem to be to draw their pay and give in return the least possible amount of labor. Thus when I 'met up' with this paragon of economy and honesty I

waived all other requirements and turned the place over to him with a thankful heart.

"I soon found that his economical ideas permeated his whole system, for his letters and reports were few and short and if brevity is the soul of wit he is at once the wittiest man ever.

"After several years of his management I decided to visit the place and see for myself what was happening. Across the road from my place was a grove whose owner was reputed to be making big money out of his trees. To him I went for advice.



EUREKA LEMON TREE—BEFORE PROFESSIONAL PRUNING

One of the lemon trees told of in this story—so shapely and attractive to the eye!

"Your trees look so ragged and uneven in their outlines' I ventured, pointing to my own which, according to my innocent eyes were better looking being as shapely and even as a lot of Christmas trees.

"Yours do look better from an artistic standpoint, but let me show you why that isn't the ideal shape for an orange tree.' We walked over to one of his trees. It was almost ragged in appearance and instead of the dense wall of green which

formed a fairly impenetrable mass on the outside of my trees, his were open to the heart, and one could see deep into them at any point. There wasn't a dead limb on one of them, while they bore plenty of young vigorous limbs all new growth. The sunlight reached every part, inside and out, and each tree was loaded with fruit.

"Then we walked over to my side of the road. The tall shapely trees looked wonderfully attractive to me. We got down on our knees and crawled under the low sweeping boughs into the tent like center. Instead of

young green growth there was nothing but dead limbs in the center and the shade was so dense that the sunlight scarcely penetrated into the heart of the tree.

"A victim of poor pruning" was his remark. Then he showed me how the pruning must have been done by inexperienced men for instead of cutting the limbs off as close as possible to the body of the tree, most of the stumps had been left an inch or two long. This prevented the bark of the tree from healing over the wound left by the operation, nature's remedy, and each stump was rotting at the end, an ideal place for disease to get a foothold.

"Then and there I learned that to produce citrus fruits you must open up your trees to the sun and air, and by

know it all, want \$3.50 a day. Whats more, the Japs go right ahead with their work and get done, while the Dagos fool along on the job, look at the trees, stand off and gaze at 'em as if they were trying to paint a picture and them trees were models.'

"I said nothing, for it seemed hopeless to try to educate the man who as the bible says has neither the hearing ear, nor the seeing eye. Years of work in an orange grove had apparently not taught him that there was a scientific side to pruning and it did not merely consist of sawing off a few limbs here and there, with the main idea of securing a tree shaped like a toy Christmas tree, regardless of the fact that the tree's great purpose in life was presumed to be fruit production.



THE SAME TREE, BUT AFTER THE VISIT OF THE PROFESSIONAL PRUNERS

A total wreck—ragged and unsightly to the eye. It is the same Eureka lemon tree in my grove, after manhandling by those Corsicans.

keeping the dead wood cut out, furnish plenty of young vigorous limbs upon which to grow it. To an up-to-date orange grower, dead wood on an orange tree is anathema.

"I went after my man on the question of pruning. 'Who does our pruning?' I demanded. 'Japs, mostly,' was his reply. 'Are they the best for the work?' I was inexorable. 'Well—perhaps they aint as scientific as some others but,' and here his penchant for economy came to the front, 'they do the work just as well, as far as I can see, and charge a whole lot less.' 'For instance,' I persisted. 'Well, the Japs charge \$2.25 a day for pruning, while the Sicilians and Italians who claim to

"The next day in answer to my request my friend sent a Corsican pruner to see me, a man born and raised in the citrus groves of his native land. He had great hoops of rings in his ears, was dark and swarthy in complexion and reminded me of the three bandits in Fra Diavolo. Also he weighed about 200 pounds, was not an inch over five feet four in height and his build recalled a boyhood recollection of a picture in a Sunday school book of the mighty Sampson engaged in his cheerful task of tearing from their roots the gates of Gaza.

"Also he arrived in a Ford, which impressed me. The Japs came on foot. He looked over my splendid lemon

trees and shook his head. Crawled on his hands and knees under their low sweeping boughs to get inside; peered up through their dim interior and shook his head still more. Every time he did so those great gold ear-rings waved and blinked in the sunlight like a section of the jewel tower at the Frisco fair.

"With him was a young chap to whom he occasionally confided a few thoughts in their own language. I began to feel uncomfortable, as if I had perpetrated some outrage against them both, and that the outrage had something to do with the way those trees had been pruned. Nor was my judgment wrong. In his experienced eyes a gross outrage had been committed upon every tree in the whole grove. He was arrayed in a sky blue suit of clothes, a stiff linen collar at least three and one-half inches high encircled his short brown neck and a brilliant red four-in-hand tie lit up his front like an Arizona sunset. It was a very hot day, the trees were dusty from the long rainless spell, and when he finally emerged from his last inspection he looked somewhat the worse for wear. His collar was wilted to a rag, that sky blue creation with trousers that measured more across the seat than they did in length—peg tops of the most exaggerated type—a favorite cut of his class, was dusty and laced with cobwebs. He mopped his rosy face with a pink handkerchief that after the operation reminded you of the print shop roller towel. Breathlessly I waited for his verdict.

"'You trees bad shape,' he blurted out, just like that, as if to give me the worst right at the beginning. 'Looka like some wood choppa man done da prune.' He waved his arms towards the lemons. 'He nicea looka trees for park, nabbeso, but no gooda for fruits. 'Dat tree,' and he picked out one of the most shapely in the lot 'dat

tree take one gooda man four hour to prune right, maybe so do four tree one day—dat a gooda work.'

"I did some mental figuring. Four trees divided into \$3.50 meant almost 90 cents a tree, there are 80 trees to the acre—\$72 an acre for pruning. I hoped my man had not heard the time limit set by the gentleman with the ear-rings. I sighed. Experience surely did cost money. Nevertheless my blood was up and I made a bargain for three men to come the next morning and start the work. I didn't get down to the grove until about three o'clock the next day. The rows of lemons were the first trees in the grove to strike the eye as you alighted from the trolley. I glanced towards the place. The sky line seemed to have a strange, unnatural appearance. The first rows of trees looked as if a cyclone had struck them. They stood rough and gaunt, their denuded limbs holding their mangled stumps toward Heaven, as if in mute appeal against such an outrage as seemed to have been perpetrated upon them. On the ground there was apparently more wood than in the trees. In fact, about some of them the limbs made a pile quite as high as the trees themselves.

"Now pruning to me had always meant a gentle lady-like clipping of tips here and there, a sort of polite tree manicuring if you please. This work had apparently been done with a ruthless hand almost heroic in its treatment. But I had determined to go the limit on the reconstruction of my grove and if this was the proper way to do the job I would make no outcry.

"Time however, justified the treatment. My Corsican friend and his fellow conspirators knew their business. Next year those trees will bear fruit on every limb where none has been borne before, for the trees have produced new wood so fast you can almost see it grow; fruit bearing wood of the best kind."

NEXT SEASON AT GLACIER

SECRETARY of the Interior Lane announces that the enterprises engaged in the accommodation and entertainment of tourists at Glacier Park have already completed arrangements for the 1919 season, which begins June 15 and ends September 15. All hotels and chalets will be open and there will be adequate transportation facilities on the road and trail systems. The usual rates for service will prevail.

The National Park Service plans to make many new trips available for Glacier Park visitors next summer. In this connection, a new trail across the Continental Divide through Logan Pass, connecting the St. Mary Lake region with Granite Park and Lake McDonald, is worthy of special mention, as it promises to be an exceptionally popular feature in a successful after-the-war season.

A FOREST FIRE IS A REAL ENEMY

Carelessness causes many fires. Are you careless? Never leave your camp fire without making sure it is completely out. We won the war to defend Democracy. Must we now fight forest fires? Are you careful with fire in the forest? Burning matches cause fires. Break your match in two before throwing it away. If you discover a forest fire, put it out.



PHILIPPINE FORESTERS ARE PATRIOTIC

THIS IS THE FLOAT OF THE BUREAU OF FORESTRY IN THE FOURTH LIBERTY LOAN PARADE ON OCTOBER 12, 1918, AT FAR-AWAY MANILA.

PLANTS THAT OCCUR IN BOTH NORTH AND SOUTH ATLANTIC STATES; TOGETHER WITH NOTES ON THE AMERICAN SPARROW HAWK

BY MAJOR R. W. SHUFELDT, M. C., U. S. A.,
MEMBER CHICAGO ACADEMY OF SCIENCES, ETC.

(Photographs by the Author)

IT IS a well known fact, especially in the northern sections of the country, that some of the plants blooming during the early summer months have very inconspicuous flowers, but when autumn comes around and these same plants go to seed, their seed-pods stand among the most ornamental growths of the kind met with in nature. One of the most conspicuous of these is seen in the Climbing Bittersweet (Fig. 2), whose flowers are notably small, greenish, and in little clusters at the termination of the branches. Hardly anyone would notice them, unless specially searching for a specimen. However, late in the fall an entire transformation takes place in this "twining shrub," as some botanists have called it. Its beautifully shaped leaves turn to a brilliant Naples yellow and its seed-pods to a deep orange. Nor is this all; for the latter, upon splitting open into three partitions, display the gorgeous scarlet-tinted covering to the seeds. The display they then make is one of marked beauty, and branches—or runners—bearing the pods are gathered by many for home decoration. It is truly wonderful the length of time these seed-pods will retain their original colors without fading in the least degree—sometimes for many years. A fine branch, at hand at this writing, was gathered some ten years ago in New York State, yet the yellow and orange tints are as intense as the day it was gathered.

Beyond the fact that this vine is related botanically to the Spindle Tree (*Eoonymus*), it is difficult to understand why some insist upon calling it a tree—the "Staff Tree." Doctor Gray called it a "twining shrub." Matthews speaks of it as a "twining, shrubby vine, common on old stone walls and roadside thickets, and sometimes climbing trees to a height of twenty or more feet. The light green leaves are smooth and ovate, or ovate-oblong, finely toothed, and acute at the tip; they grow alternately



A GRANDFATHER CHESTNUT ALL READY FOR THE FIRST SNOW BLANKET
Fig. 1—Along the hill-top, just over the western boundary of Rock Creek Park, Washington, District of Columbia.

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climbing trees to a height of twenty or more feet. The light green leaves are smooth and ovate, or ovate-oblong, finely toothed, and acute at the tip; they grow alternately

and somewhat in ranks owing to the twisting of the stem. The tiny flowers are greenish white, and grouped in a loose, spike-like terminal cluster; the five minute petals are finely toothed along the edge, and the five stamens are inserted on a cup-shaped disc in the manner explained."

Bitter-sweet vine is often seen growing over the old stone walls in New England, the deep gray of the latter affording a fitting background for the matured fruit in the autumn. It would appear that it is not found in nature further south than North Carolina, while it ranges westward to New Mexico and north to the Dakotas.

It is a wide span between *Celastrus* and any of the Iris family, a species of which is next to be considered—though only in part; that is, attention is invited to its remarkable fruit, which, in any instance, so closely resembles a big



THE IRIS FAMILY IS KNOWN AS THE *Iridaceae*, AND ITS BEST KNOWN GENUS IS *Iris*, WHICH HAS BEEN CREATED TO CONTAIN THE IRISES, THE FLAGS, AND THE FLEUR-DE-LIS

Fig. 3—One of the daintiest plants of this group is the Blackberry Lily (*Belamcanda chinensis*), shown here just before the seed pods open up.

ripe blackberry. (Figs. 3 and 4.) Next summer its flowers will form the subject of one of our illustrations, as specimens of them were not obtained during 1918. We may say here, however, that its flat, blade-like leaves closely resemble those of the common iris or Fleur-de-Lis, the favorite flower of France; some of these leaves may be seen, in part, in the cuts. In passing, it may be said that the flowers of the lily are of a deep orange, finely and irregularly speckled with deep crimson and purple. On an unnumbered plate, Neltje Blanchan gives us a pretty illustration of them, though it has suffered through undue reduction in reproduction. This authority informs us that the plant originally came from China, and was first reported as a wild flower at East Rock, Connecticut; next on Long Island, and then at Suffern, New York. It is surely a very beautiful addition to our native flora, and it is hoped that the Orient will favor us in a similar way with still other plants.

The genus of the Iris family containing the greatest number of species is *Sisyrinchium*, the Blue-eyed grasses, of which Gray gives some fourteen different kinds for eastern United States alone, against the single species of the

Blackberry lily described above. The flowers of these two genera are somewhat alike in form, and quite different from an iris or Fleur-de-Lis.

Our remarkable parasitic plant, the common Dodder (*Cuscuta groenovii*), was figured and described in a recent issue of AMERICAN FORESTRY; but who would for a moment think that this curious murderer of other plants was a member of the



OUR *Celastraceae* OR STAFF TREE FAMILY HAS SOME CURIOUS PLANTS GROUPED IN IT. THIS IS THE SHRUBBY BITTER-SWEET, A STOUT VINE, NAMED THE "STAFF TREE" (*Celastrus scandens*)

Fig. 2—It has also been called the Climbing Bittersweet, or the Wax-work vine. Its leaves are beautiful and so are its remarkable berries.

same family as the beautiful morning glories (*Ipomoea*), or the bindweeds, and the sweet potato vine? Yet all these plants and still others have not a few characters in common, which, from the viewpoint of the scientific botanist, certainly throw them into one and the same assemblage—the *Convolvulus* family; they owe this name to the fact that in all of them the corolla is *convolute* or twisted in the bud. Two such buds are here shown in Figure 5, which illustrates our common Bindweed. All morning glory buds are twisted up like this, as are the little scarlet ones of our Cypress Vine; and there are a great many plants of



SOME OF THESE CERTAINLY LOOK LIKE RIPE BLACKBERRIES, AND SO WILL ALL OF THEM WHEN THEY FULLY OPEN

Fig. 4—The plant originally came from Asia, and its generic name is of East Indian origin. It is known as the Blackberry Lily (*Belamcanda chinensis*).

this group in other countries besides the United States.

In the case of the Bindweed, the flowers are of a glistening white, and for this reason the plant may be recognized at a long distance. It often climbs and masses upon other plants, cutting off the sunlight from the latter. Then, again, we may find it in the most shady corner of some deep wood, and the example here shown flourished in such a place, being photographed *in situ* with no little difficulty. Finally, we may find bindweed growing in great masses in an open field, with hundreds of its lovely, immaculate flowers glistening in the bright sunlight. Sometimes these blossoms are tinged with pink, and other species possess still other characters. The one here shown is the common Hedge Bindweed (*C. sepium*); it may become ten or twelve feet long, while other species, such as Trailing Bindweed (*C. s. repens*), the Small Bindweed (*C. arvensis*), and others, rarely exceed a yard or less in length. Most of the larger species of bees are great patronizers of the representatives of this family of plants. It is by no means an unusual sight to see a Dodder vine twisting itself all over a Hedge Bindweed, exhausting its life juices—and to think that both are members of the same family! It might well be called a kind of floral fratricide.

Our Cypress Vine (*Ipomoea quamoclit*), another convolvuline species, already referred to above, with its pretty little scarlet flowers, came from Tropical America, and now flourishes in many places in the South. We frequently see it growing over garden fences and similar places. Its flowers are said to be white in the case of some plants, and there are other species and subspecies (varieties) of it.

We have many interesting plants in the Lobelia family, several of which have already been figured and described in previous issues of AMERICAN FORESTRY. An average example of the Great Lobelia is here reproduced in Figure 7; and this is a plant which, in favored spots, may occur in great numbers, producing, when in full flower, a blaze of splendid sky-blue, which may be seen a long distance off. Sometimes its flowers are pure white; and, whatever their color may be, they

are usually found growing in moist or wet places.

When our Ruby-throated Humming-bird of the East was more plentiful than it now is, it was frequently seen visiting these flowers of the Great Lobelia, as their tube-shaped corollas constituted the very style of flowers that these little gems of the bird-world fully appreciated. The cross-fertilization of the Lobelia is, however, principally accomplished through the agency of bees of various species and certain large flies.

THE AMERICAN SPARROW HAWK

BY MAJOR R. W. SHUFELDT

(Photograph by the Author)

WE have a splendid array of falcons and hawks and their near allies in the bird fauna of this country, and of all these many species our Sparrow Hawk is not only the smallest but decidedly the handsomest in plumage. Upwards of a dozen vernacular names have been bestowed upon it in different parts of the United States, while its scientific name, given it by Linnaeus generations ago, *Falco sparverius*, is the one by which every ornithologist knows it the world over.

In length, the Sparrow Hawk measures less than a foot, and the plumage color-pattern is different in the two sexes. Both are very handsome, though the male is rather the more striking in this respect. An adult male, in full breeding-feather, has the top of the head of a clear ashy blue, all to a central patch, which latter is a bright chestnut. The back of the neck and the sides are of a dingy pale yellow, with an ashy area on the former. The entire back and shoulder is of a clear chestnut rufous, transversely barred with black. Wing-coverts and secondary wing-feathers ashy blue like the crown,



THIS LOVELY WHITE FLOWER IS OF THE VINE KNOWN AS HEDGE BINDWEED, WHICH, IN THE SOUTH, MAY BLOOM UNTIL VERY LATE IN THE SEASON

Fig. 5—Bindweeds are close relatives of the Morning Glories and Cypress Vines; they are all grouped in the *Convolvulaceae* or the *Convolvulus* family.

the feathers each dotted with black; the flight-feathers are dusky, margined with yellowish white. The rufous-colored tail is tipped with white, and embellished with a subterminal bar of black. There are markings of black on the side of the head and nape. Breast, and to a degree below it, pale rufous or rusty, and then whitish to the tail. All of this area is spotted with black, beginning above, with fine dots on each feather, and ending below with much larger ones. Tail-coverts beneath, pure

white. Irides, rich brown; feet, yellow with black claws, and a yellow area around either eye as well as the base of the blue-tinted beak.

In the female, fine black bands mark the entire tail, the terminal one being broad. She has a longitudinally streaked crown, with pale brownish streakings on a yellowish-white breast and lower parts. Her shoulders are rufous red, while in most other respects she more or less nearly resembles the male in her coloration.

Our Sparrow Hawk chooses curious places sometimes wherein to lay its clutch of beautifully marked eggs, the ground-color of which usually is a cream-white. Occasionally the female is satisfied with a deserted hole of any of our larger woodpeckers, while any other hollow in a tree has been made to answer. The eggs have also been found in rock cavities, and in various holes in clay and sand-banks, while nesting-boxes set up for other birds have been selected; and when these were not available around the home, the pair will even choose any old cranny under the barn-roof or a similar place in any of the larger out-houses.

Judging from the above, it is not at all difficult for us to imagine that our little Sparrow Hawk has a strong leaning toward real sociability with respect to his arch enemy—man. Many years ago, I had in my possession a tame one, which was kept for several months, and during all that time it was one of the most interesting little pets imaginable. There was no difficulty whatever in my making a number of fine photographic negatives of him, and the picture obtained from one of these has been reproduced as an illustration to the present article. Perhaps I may be pardoned for the pride I felt when, with others of a set of animal pictures, it won a prize at an exhibit given under the auspices of the Aintree Photographic Society at Liverpool in November, 1898 (Class "K")—twenty years ago.

Only at exceptional times do Sparrow Hawks prey upon our small song birds, and upon still rarer occasions

very young chickens or ducklings are taken by them from the farm yard. On the other hand, however, this little raptorial prince kills and devours every year simply thousands of field mice, moles, grasshoppers, crickets, and no end of other insects and small mammals, the ravages of which are only too well known to every farmer and agriculturist from one end of the country to the other.

In the autumn, when we observe a Sparrow Hawk hovering in his characteristic way over some corn-field where the grain has been shocked up, and giving vent to his well-known call of *Killy—Killy—Killy—Killy—Killy*, we may be sure that he is in quest of the first field mouse that has the temerity to show itself. Note how he checks himself; and, suspended over one spot on quick-wavering wing, his piercing eyes have detected the unhappy mouse below. Down he comes in a graceful swoop—and the distant squeal of the unfortunate rodent is distinctly heard.

On account of this wavering flight, many people have applied the name of "windhover" to the Sparrow Hawk; and, as it is a vernacular name with a reason for it, we may let it go at that. This also applies to calling it the "Kitty hawk," while, as already remarked, it has been given not a few other common names.

In Florida the Sparrow Hawks are said to be smaller than the more northern species, while there are also desert forms of them in the western country; descriptions of these will be found in most works presenting popular accounts of our raptorial birds.

As pointed out in a previous paragraph, the Sparrow Hawk in captivity makes a very engaging little pet. To

bring this about, not a little patience must be exercised—above all else no end of well-directed tactfulness and kindness. As a matter of fact, the history—both written and traditional—of the attitude assumed by man toward any or all of the animals below him in the biological scale, is responsible for the behavior of any particular one of them, with respect to the development of gentle-



GREAT OR BLUE LOBELIA IS A RELATIVE OF THE RED CARDINAL FLOWER, BOTH BELONGING TO THE *Lobeliaceae* OR LOBELIA FAMILY

Fig. 6—It is not difficult to recognize the bright blue flowers of this plant (*L. siphilitica*), of which the example here shown is an average specimen.

ness or ferocity. This applies to the lowest as well as the highest forms, or we might say from insects to the higher apes inclusive. Our literature on this subject—which is both interesting and important—is, as yet, not very extensive. The subject is deserving of far more study and close attention than it has received up to the present time. No one of the vertebrate groups furnish better illustrative examples of all this than do birds. For many years past there has been almost a universal movement on foot to encourage the matter of good fellowship between many species of our small land birds and our own species. At first only a limited number of people entered the field to bring this relationship about where possible, and it was chiefly accomplished through placing attractive foods for them in convenient places out-of-doors; through the establishment of bird

homes in the trees and elsewhere, and the feeding of many birds in the wintertime at close quarters in the

open. At this writing this is a very common practice all over the country, and it is truly remarkable to note the beneficial and most interesting results.

Many explorers of new lands have frequently noted how tame all the birds were that they came across in places previously entirely unknown to man. It was as true of land birds as of the marine forms or the so-called water birds. One traveler was returning from a spring with a small camp pitcher in his hand filled with water, when some bird, about the size of a robin, came and lit on the brim of the vessel to get a drink for itself. This was on one of the East Indian Isles; and if memory fails me not, the explorer was Alfred Russel Wallace.

But the literature of exploration teems with such accounts, though, unfortunately, examples of the kind are becoming more and more rare. Through the use of traps

and guns and persistent persecution of many kinds, nearly all—indeed all the various species of birds in this



Fig. 7—The Sparrow Hawk is one of the handsomest of our American Hawks.

country have become extremely distrustful of man. This applies to the representatives of every avian group, from loons to bluebirds; and it is a crying shame that the unfortunate relationship can so easily be proven to be true.

Now, the true raptorial birds and owls form no exception to the above rule, and our little Sparrow Hawks, referred to above, would seem to be especially susceptible to kind and gentle treatment. They make, as stated before, very interesting not to say charming pets for those who have a leaning toward keeping any of our native birds in captivity. A Sparrow Hawk may be kept in a good, roomy cage, or in some place where it can enjoy its outdoor freedom at will. In the latter instance, the bird has been known to return home to roost every night, and to come to call if within hearing. Finally, it will delight in flying down to rest upon your hand or shoulder, to receive any food you may have for it. No doubt, if kept in a large "flying cage," a pair of these birds would breed in captivity. The young are at first feathered with a full plumage of pure white down, and it is a long time before they assume the plumage of either of the sexes when adult. All of this part of their history, with numerous illustrations, I have published in other connections many years ago.



Photograph by Western Newspaper Union

WOMEN FELLING TREES NEAR PETWORTH, ENGLAND

One of the many unusual tasks performed successfully by the women of England was the felling of trees. This picture shows a group of happy workers drawing the felled logs to a train where they were loaded by other women and sent off to the mills.

AN Associated Press dispatch from Birmingham says: Canes of walnut from a tree which stood in front of the Birmingham meeting house before the battle of Brandywine, have been made by a local concern. They were sold at a bazaar for the benefit of war hospitals.

Other canes were sent to French war officials as mementoes of General Lafayette, who was wounded almost within the shadow of the tree.

One cane made of a selected piece of the tree has been sent to M. Jusserand, the French ambassador at Washington.

ACKNOWLEDGEMENT OF CHRISTMAS BOXES

The following cordial letter has been received by the Welfare Committee for Lumbermen and Foresters in War Service thanking the Committee for what was done for the boys at Christmas:

"American Forestry Association,
Washington, D. C.

December 31, 1918.

Gentlemen:

I have just received your cablegram announcing that 200 additional Christmas labels from forestry troops in France, received too late for the shipment of boxes, have been responded to with Christmas cards and a very generous money gift. The American Forestry Association has certainly been a most generous and warm-hearted Santa Claus for the forestry troops in France at this Yuletide period. I wish to thank you in behalf of the men in the 10th and 20th Engineers and the other troops working with them; and I assure you that we will all carry very grateful memories of the friendship and interest shown in our work and in us personally by the Association.

Very sincerely yours,
Lieutenant-Colonel Engineers." (Signed) A. B. GREELEY,

TO PURCHASE ADDITIONAL LANDS FOR EASTERN NATIONAL FOREST

THE National Forest Reservation Commission has just approved for purchase 54,744 acres of land for national forests in the White Mountains, Southern Appalachians, and Arkansas.

The largest tracts purchased are in Georgia, where the resumption of purchase work has been authorized by the commission. An aggregate area of 38,108 acres in Rabun, Union, and Townes Counties, scattered through 39 tracts, was approved for purchase at an average price of \$7.22 per acre.

In Alabama, in Lawrence and Winston Counties, 5,159 acres were approved at an average price of \$4.30; in North Carolina, in Macon and Buncombe Counties, 1,940 acres were approved at an average price of \$4.30 an acre; in Virginia, in Augusta and Shenandoah Counties, 1,381 acres were approved at an average price of \$4.36 an acre; in West Virginia, in Hardy County, 40 acres at an average price of \$7.00 an acre, and in New Hampshire, in Grafton and Coos Counties, 9.04 acres at an average price of \$6.68 an acre.

In Arkansas, 7,269 acres, located mainly in Polk, Pope, Johnson, and Garland Counties, were approved for purchase at an average price of \$3.61 per acre.

To date the National Forest Reservation Commission has approved for purchase 1,702,534 acres for national forest purposes in the 17 areas of eastern national forests.

HOW WOOD COMPARES WITH COAL IN HEATING VALUE

In heating value one standard cord of well-seasoned hickory, oak, beech, birch, hard maple, ash, elm, locust, or cherry wood is approximately equal to 1 ton (2,000 pounds) of anthracite coal, according to estimates by the Forest Service, United States Department of Agriculture. However, a cord and a half of soft maple and 2 cords of cedar, poplar, or basswood are required to give the same amount of heat.

One cord of mixed wood, well-seasoned, equals in heating value at least 1 ton of average grade bituminous coal.

THE USES OF WOOD

WOODEN ARTIFICIAL LIMBS

BY HU MAXWELL

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

THOSE who compile statistics of the artificial limb industry usually include crutches; and occasionally canes and surgeons' splints are likewise included. A similarity of purpose exists in all articles of this class, but there are several differences in the processes of manufacturing as well as in the materials used. Wood is common to all, but the different articles require woods of different kinds. There is less reason for including canes than crutches; for most canes are not employed by persons as an assistance in walking, but rather for the sake of fad or fashion; but crutches and artificial limbs are used by disabled persons exclusively. In consideration of

demand for crutches and limbs will continue long after peace shall again be restored.

The limbs wear out and crutches break and must be frequently renewed. The export of artificial limbs from this country is not large, neither are the imports. Shortly after the beginning of the present war, when it became apparent that many maimed men would return from the battlefields, limb manufacturers in the United States established branch houses in some of the European countries, ready to serve the unfortunates who might lose legs or arms. It is preferable but not absolutely necessary that the manufacturer of a limb shall make personal



TYPICAL WHITE WILLOW TREES

Nearly all of the white or English willow wood that furnishes wood material for artificial limbs grows in city parks and on road sides where the trees were planted for shade and ornament. The trunks are usually thick and short, and the larger they are the better the wood is. The photograph from which the above cut was made was taken in a Chicago park.

that fact, the present article will class crutches and false limbs in the same industry but will exclude canes. That is the treatment accorded the subject by the United States Forest Service.

The total bill of woods consumed annually for limbs, crutches, and splints in this country, according to government statistics, is 687,980 feet, board measure. That compilation was made prior to the beginning of the present war and represents an average consumption in normal times. Without doubt, the industry has grown much since, and many years must pass before it again falls as low as it was in recent times of peace; because the

measurements and supervise the fitting and adjustment. Several leading American manufacturers have established finishing factories in the allied countries. These factories are supplied with artificial limbs in quantities from headquarters in the United States. The fitting and finishing work on these limbs is done at the finishing factories, where each limb is adapted to the individual requirements of the wearer. The finished article has never been exported in quantities, nor is it practical to do so.

Some of the warring governments supply cheap legs for their crippled soldiers, but they are of iron, and little or no wood enters into their use. Possibly after



WOODEN LEG WITH JOINTS

This illustration gives a good idea of the shell and the internal mechanism of a wooden leg of the latest design. Nature is imitated as closely as possible, and the lightness of the limb is surprising. It weighs only a few pounds and there is not an ounce of superfluous material in it. From the catalogue of the Pomeroy Company, New York.



FACTORY-MADE PEGLEGS

Sometimes the pegleg without the ankle joint is preferred or is considered necessary, but the old club that was made on a turning lathe or with a drawing knife has been displaced by a wooden limb which is light, serviceable and artistic in appearance. Some of the modern patterns are shown in the above collection from the catalogue of a well-known manufacturer.



the war the various governments may furnish their soldiers with limbs as a part of the pension system. Following our Civil War, our government supplied 100,000 artificial limbs to disabled soldiers and sailors, and the practice of supplying them was kept up during several years. The Congress passed legislation in the fall of 1917 known as the War Risk Insurance Act. One of its many commendable features was a provision accompanied by an appropriation for the supplying of artificial limbs to amputated soldiers of this war. It is the

policy of the War Risk Insurance Bureau, I am informed, to supply the permanent



HE CAN FIRE AN ENGINE

artificial limb as soon as the amputated man is prepared for its use.

Between 125 and 150 firms making limbs carry on business in this country. Some are large establishments employing factory methods and operating on a fairly extensive scale, while others are small, giving employment to only a few persons, and doing a large part of the work by hand. It is a business that can be carried on in a small way without calling for much capital, though it is capable of enlargement without limit.

The average life of an artificial limb is about eight years, and repairs are frequently necessary during that time, for accidents befall artificial members as frequently as those which nature provided the wearer, but with this difference, the limb which nature gives does not wear out, while the man-made substitute is a machine which is not guaranteed to bear its burden and do its work for four score years and ten. There are differences in these machines as there are in machinery of other kinds. Some are better than others. Each manufacturer persuades himself that his product is best, and he tries to persuade

others that such is the case. More than one hundred and fifty patents have been issued on artificial limbs in this country, and nearly every patent is backed by an owner or agent whose business it is to push the article by all fair methods. That helps to account for the numerous claims of superiority by different manufacturers. Some of these claims are doubtless urged more strongly than is warranted by real merit; yet the fact cannot be disputed that many ingenious and valuable devices are in use and that frequent improvements are being made.

It remains a fact, none the less, that most manufactured limbs have their weak places and that not one has yet been invented that equals nature's own device. The joint is the hard part to imitate. The natural joint is a wonderful piece of mechanism and it defies all imitations. The manufactured product may have joints modeled after nature with the most painstaking care; yet the most enthusiastic manufacturer does not claim that he can make an ankle joint as good as the real article. The nearer it copies nature, the more complex it becomes and consequently the more liable it is to get out of order. Even the natural ankle is sometimes sprained and put out of commission for days or weeks at a time, and the artificial is still more liable to meet mishaps. A doctor may charge twenty-five dollars for repairing a displaced ankle

A man with an artificial leg is not necessarily debarred from occupations which might be considered impossible. The accompanying pictures give scenes from real life, though rather rarely encountered. The power of the will has as much to do with it as the power of the wooden leg.



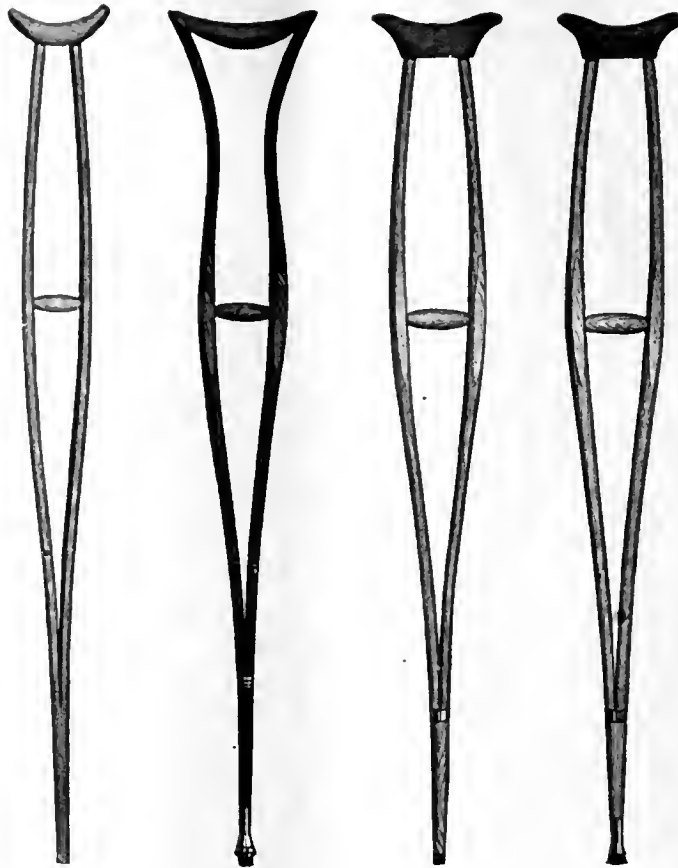
WOODEN LEGS MAY BE USED IN CLIMBING

bone; and it is no reflection on the manufactured article if it calls for repairs that cost money. Some such joints may cost twenty-five dollars in a year in repairs, or twice as much as the natural foot costs in shoes. A repair bill of that size, however, is declared to be excessive by the makers of some of the best artificial ankle joints. The case is said to be similar to that of an automobile which may go a long time without any cost for repairs, and then run into a streak of bad luck.

A high grade wooden limb consists of more parts than a casual observer would suppose, and most of the patents cover details rather than the general form of the limb. All efforts are directed toward imitating nature as nearly as possible in form and movement. So close is the imitation in some cases that the wearers of artificial

limbs conceal the fact from all except their most intimate friends. Some wearers of such imitations can play ball, climb ladders, enjoy hunting and fishing, skate, and in many other ways take part in the affairs of business and pleasure. The catalogues of manufacturers of wooden arms and legs contain so many testimonials from wearers who seem pleased with the substitutes, that the reader is inclined to doubt whether they should be classed with the unfortunate. Much more is heard of artificial legs than of arms. That is because the loss of a leg is a much more serious matter than the loss of an arm, and the one-legged man is at a greater disadvantage in the ordinary affairs of life than the man is who has only one arm.

The false limb is not a modern invention. No one knows when the first came into use, but they are mentioned in writings hundreds, even thousands of years old. The beginnings were doubt-



THE OLD RELIABLE CRUTCH

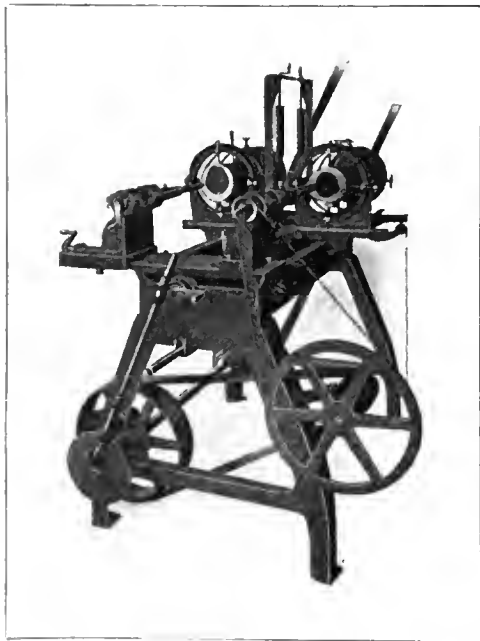
The crutch is considered to be an artificial limb and is so listed in statistics of manufacture. It has been called the first aid to the crippled. The article is made in several styles and the buyer may pay for style as well as for service.

less crude wooden leg as a club to quell a belligerent lumberjack.

make shifts. American Indians cut forked poles for crutches and other savages probably resorted to that or to other devices to assist cripples in getting over the ground. The crutch or the staff was the real invention and all that has followed may be considered as improvement and development. There are records of highly artistic arms made of wood centuries ago. It seems to have been more difficult to make a successful arm than a leg, and it is somewhat the same yet, but that is because an arm is required to perform more functions than a leg.

Nearly any wooden leg or arm can be made to perform one or two functions very well, and that was what was aimed at by makers centuries ago; but it becomes quite another problem when the attempt is made to pro-

artificial arm is now produced that is as perfect as were some in existence centuries ago. That claim is based on written descriptions which are largely imaginary. A few ancient manufactured arms have come down to the present time, and are preserved in museums. Some of these arms are clever and ingenious, but they are not to be compared with the best product of the present time. They usually weigh twenty-five or thirty pounds, in contrast with the two pound weight of the best arm now made. According to some of the old writers, weight was desirable in an artificial limb, since the owner might want to use it as a weapon to knock out his foes in battle, and the heavier the better. That viewpoint is not wholly ancient, for a scene in a modern story has one of the characters in a Michigan frontier town using his



A LATHE UNIQUE IN ITS MECHANISM

There are lathes which shape gun stocks, shoe lasts, and wooden doll heads, but the above cut represents one even more specialized. It shapes the interior of wooden legs, down almost to millimeter measurements. Few machines equal it in accuracy of work. It was invented by the J. E. Hanger Artificial Limb Company, Washington, District of Columbia.



THE FIRST FACTORY OPERATION

This crudely shaped block of English willow is the raw material with which the artificial limb maker does his best work. It is the first stage in the process; but before it has advanced thus far, the wood has undergone many months of air seasoning, for the workman must not touch it until it is in perfect condition.

Some persons, on insufficient evidence, have made the claim that no

duce something that will take the place of nature's handiwork generally. The bones, flesh, tendons and cartilages, and particularly the nerves, of the natural limb do specialized work which the best substitutes can seldom equal.

The best kinds of artificial arms weigh from one to two and a half pounds; legs from four to seven pounds. The lightest are for small persons. In a few instances legs are manufactured for children less than two years old, and for persons

eighty or more. When limbs are fitted on a person who is growing rapidly, frequent changes are necessary.

The cost of limbs varies so widely that it is impossible to name an average; but the prices quoted in the catalogue of a well known manufacturer of these articles range downward from \$150. The size of the artificial limb does not govern the price so much as it is governed by the kind of workmanship employed in its manufacture and by the patented devices used. The rough material is not expensive. A few pounds of wood, a little leather, rubber, steel, and shellac constitute the materials, but the labor that forms and fits them is expensive and is responsible for the principal items of cost.

Different manufacturers advertise special features of their product and claim high value for certain devices. Competition is keen, and the unfortunate person in need of a limb has many offers from which to choose; but

there is not much difference in the range of prices for similar articles.

The cheapest and crudest artificial leg is the wooden peg which is strapped in place and can be made by any carpenter or turner for a few dollars. This is the historical peg that figures in chronicles, romances, and

poetry. The comic supplement artists who illustrate Sunday papers equip the pirates and hoboes with legs of that kind. The Dutch governor of New York, as Washington Irving described him, was better known by his peg leg than by any other possession or attribute; and a stanza in Hood's "Faithless Nelly Gray" is sometimes selected by authors of school grammars

to test the pupil's proficiency in parsing ambiguous syntax:

"The army surgeon made him limbs;
Said he, 'They 're only pegs,
But there 's as wooden members quite
As represent my legs.'"

The peg is practically indestructible. It has no springs to snap or joints to rattle, and time, wear, and tear make little impression on it.

There is no hand-made arm quite as simple and substantial as the pegleg; but there is a peg arm also, and it is equipped with a hook in place of a hand. A character in Dickens' "Dombey and Son" wore one. That was the old, cheap makeshift; but modern inventors have produced one with the hook equipment, and it is by no means a cheap makeshift. Among the high-class manufactures in this line is an arm equipped with two hooks operated by springs and bands, the forms and movements apparently having been suggested by the mandibles of a stag



THE ALPHA AND OMEGA OF SUBSTITUTES

The prehistoric pegleg and its latest rival. The old is much better than nothing, but it is distanced in appearance, convenience and efficiency by the articulated member made of willow wood, metal and rawhide. The illustration is from the catalogue of the True Artificial Limb Company, Niagara Falls, New York.



THREE STYLES OF WOODEN LEGS

That on the left is a limb not extending above the knee; the next has the knee bearings, and the next is the artificial limb extending above the knee. Each is provided with its own peculiar and necessary mechanism and fittings to conform to differences in pattern. Photograph by courtesy of True Company.

beetle. The hinged hooks are so accurately adjusted that the wearer of the arm can use them in picking up a glass of water and drinking from it. When the hooks are not in use they may be concealed by slipping a hollow hand over them. This and other devices emphasize the skill, patience, and ingenuity of manufacturers in producing limbs as nearly as possible like the natural members.

Some controversy has arisen as to the origin of the word "cork" as applied to a limb. Most people are under the impression that the name implies that such limbs are made of cork, or that they are as light as cork. The latter meaning is reasonable, but the assumption that limbs are now made, or ever were made, of cork has no basis in fact. Cork is nothing more or less than the bark of a species of oak tree that grows in southwestern Europe and in northwestern Africa (*Quercus ilex*). It is too weak for use as artificial limbs, and if it were otherwise fit, it could not be had in pieces of sufficient size. The name of the limbs is said to have originated in a quite natural way, and refers to the town of Cork in Ireland where once they made artificial limbs of excellent quality. The town gave its name to the product.

In the manufacture of such limbs different materials are employed, rubber, leather, steel, felt, and wood, and

the most important of these is wood. More than one wood is serviceable, but there is one which is usually rated far superior to all the others, and it holds undisputed first place in the industry, though the government's published statistics apparently prove the contrary. These

statistics fail to make it clear that some of the woods shown in the figures are for crutches rather than for limbs proper. White or English willow (*Salix alba*) is the wood par excellence for manufactured limbs. It is frequently listed as red willow, but that is not strictly correct, for red willow is a different species, a native of this country, while white willow is foreign, though it has been so widely planted in the United States that it is plentiful in many regions.

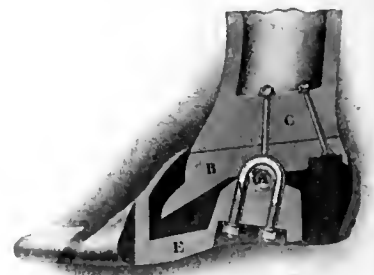
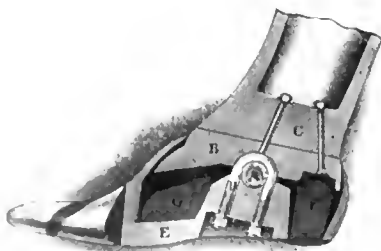
White willow is essentially a town and highway tree. It occurs in parks, in yards, on street borders, and along highways where it casts delightful shade and forms a pleasing feature of the summer landscape. Being an open-ground tree, and usually not much crowded, it develops a short trunk and an enormous crown. The tree seldom furnishes more than one short sawlog, and the logs range in diameter from one to two and a half feet. Old trees may be three feet in diameter, and in extreme cases six feet. The larger the tree the better the wood for artificial limbs.

Thus it is that the supply of wood for artificial limbs



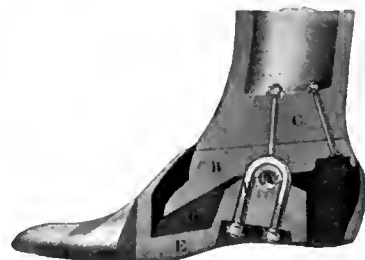
PROGRESSIVE STAGE IN LIMB MANUFACTURE

The blocks of willow wood have been roughly shaped and mounted in order to adjust the proportions preparatory to the final cutting and the finishing touches. Much of the work cannot be done by machinery, but must be perfected with carving tools used by hand. This photograph was obtained through the courtesy of Pomeroy Company, New York.



WOODEN FOOT IN ACTION AND AT REST

This illustration gives an idea of the articulation of the wooden foot and its action during the process of walking and standing still. The inventors have devoted their best thoughts to the perfection of an ankle joint which will not only act naturally, but will endure the severe strains to which it is subjected.



comes almost wholly from planted trees. Few of them were planted in expectation that they would ever come into market for lumber. They have never been regularly taken by lumbermen; but a few logs have been cut here and a few there when streets have been widened or parks cleared. The supply of willow wood from that source has generally been ample, but now, because of the war, the demand is much greater than it was formerly, and it may be anticipated that the search for suitable willow for limbs will continue for years, and no one who has trees of this wood should permit them to be destroyed but should try to dispose of them to manufacturers of limbs.

White willow that goes to factories often causes damage to saws and other tools that are employed in working it. That is done by metal in the wood. Such is a common fault with much wood that is cut from trees which have grown about residences and in the vicinity of barns and near fences. While such trees are growing they are



YUCCA PALM IN THE MOHAVE DESERT

The photograph of this strange tree was made available by the courtesy of the United States Forest Service. The scene is in southern California, where these uncouth trees, which look like specimens from the Carboniferous Age, are furnishing splints used by surgeons in setting broken bones. The equivalent of 40,000 board feet is cut annually.



RAW MATERIAL FOR SURGEONS' SPLINTS

A section of the trunk of the weird yucca palm is being prepared for the factory where it will be converted into sheets of veneer to be cut into splints for hinding broken bones. These by tens of thousands are now being sent to Europe for use in the army hospitals. The sheets of wood look like lace and are as strong as horn. Photograph by the United States Forest Service

apt to be made use of as fence posts to which to nail boards, or as posts on which to hang gates; or the planks which form sheds are nailed to them; or they may have been equipped with hammock hooks. The metal driven into the trunks remains there until the saws find it when the wood is passing through the mill or shop. The growth of a few years completely hides all trace of the metal until the logs are opened. Experienced sawmill operators do not like to handle timber that has grown in cities or towns or near barns or residences because of the hardware concealed in the wood.

White willow did not become the leading wood for limbs by any accidental choice. It was proved by trials and experience, and only after it was found to be the best was it admitted to

first place. It possesses certain characteristics that are wanted, and it has them in a higher degree than any other known wood. It is light in weight, a requisite which cannot be insisted upon too strongly; it is very tough, not easily split or splintered under blows and twists, and not apt to check or warp in process of seasoning. After it has become dry it shrinks and swells but little. The pores in the wood are very small and impurities are not readily absorbed. It cuts easily, and therefore lends itself readily to the shaving and whittling which the manufacturer must do in converting the rough billet into the finished limb. Some of the cutting is done by machinery, but much is hand work with special tools, in hollowing the inside and shaping the exterior. The limbs are hollow. They are thin shells, and willow wood is so tough and strong, in proportion to its weight that the shells can be whittled very thin. They are then covered with raw hide, the kind of leather that forms the heads of drums, and the final coat of varnish is applied to the leather. The necessary metal and other fastenings can be affixed securely to this thin shell.

The breaking of a wooden leg is a serious matter, though not so serious as the fracture of a bone of a natural leg, and it is less painful; yet some pain of a pecuniary kind may be occasioned by the knowledge that a broken willow leg may cost a hundred dollars in repairs.

The suggestion has been made that false limbs might be made of woods other than willow; and so they might be and so they have been. Willow is not the lightest wood in this country. A dozen others are as light or lighter; but lightness is not the sole quality to consider. If it were, the first place among American species would go to Missouri corkwood (*Leitneria floridana*), and tupelo roots would be available, and also the golden fig of Florida, or several of the cedars. But, on account of undesirable physical qualities, not one of these is a rival of white willow in the wooden limb industry.

Many attempts have been made to find substitutes for wood; not that cheaper material is wanted, but in some instances it is difficult to fit a wooden limb satisfactorily and other materials would be more convenient. That none of the substitutes has been wholly satisfactory is evident from the fact that wood continues to be the most widely used material for manufactured limbs. Gold has been mentioned among other substitutes, but perhaps reference to that precious metal in Thomas Hood's poem was not meant to be taken seriously. If gold were as

cheap as willow, it still would not often be employed for this work, because it is too heavy and too weak. Aluminum would be better than gold, but it has had little use, although it is claimed that the former German Emperor's withered arm has been concealed inside a hollow aluminum mechanism that passes for an arm.

Fashion has more to do with false arms and legs than might be supposed. Some wearers are as proud of theirs as smokers are of favorite pipes, or sportsmen of guns which break records, or fishermen of reels which land the largest and gamest fish. Some patrons of the limb factories buy new arms or legs nearly as regularly as they buy new clothes; not that the old are worn out, but fashion, as they think, demands new outfits at regular intervals. Besides, it is good foresight to have a new member ready for use if the old should become incapacitated by accident.

Crutches are with reason included in the limb industry, for both are put to the same use in assisting cripples to carry on the affairs of life; but the points common to the two products go little farther than the methods in which they are used. The processes of manufacture are different, so are the woods employed.

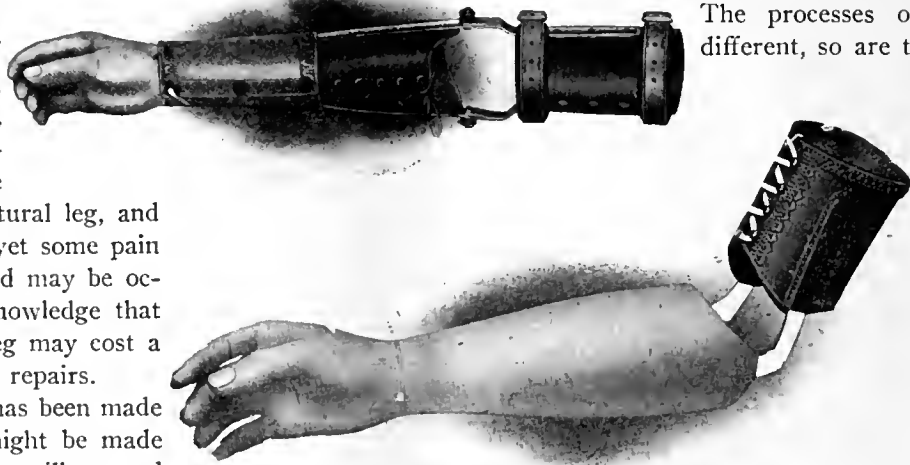
The crutch maker needs very hard and very strong woods, and weight is not objectionable; but the limb manufacturer must have light wood, yet it must be strong, and he has few species to choose from. The crutch maker has a pretty wide field of choice.

New Hampshire leads all other states in the pro-

duction of crutches so far as statistics show. Birch and maple, which are excellent woods for crutches, are abundant and of fine quality in New Hampshire. Choice woods like cherry, rosewood, and lancewood, find a place, the first two as handles or grips and as tops to fit under the wearer's arms, and lancewood, because of its strength, becomes the shaft. New Hampshire produces about 250,000 pairs of crutches a year. The best grades are made of sugar maple with rosewood handles.

If canes were admitted into the artificial limb industry, the number of woods to be listed, and the total quantity, would be much increased. Cane makers consume about 2,000,000 feet of wood a year, in addition to some woods which are never measured in feet, such as weichsel, bamboo, and nannyberry.

The wearing of artificial limbs is not restricted to any condition of life, to any size of persons, or to any age.



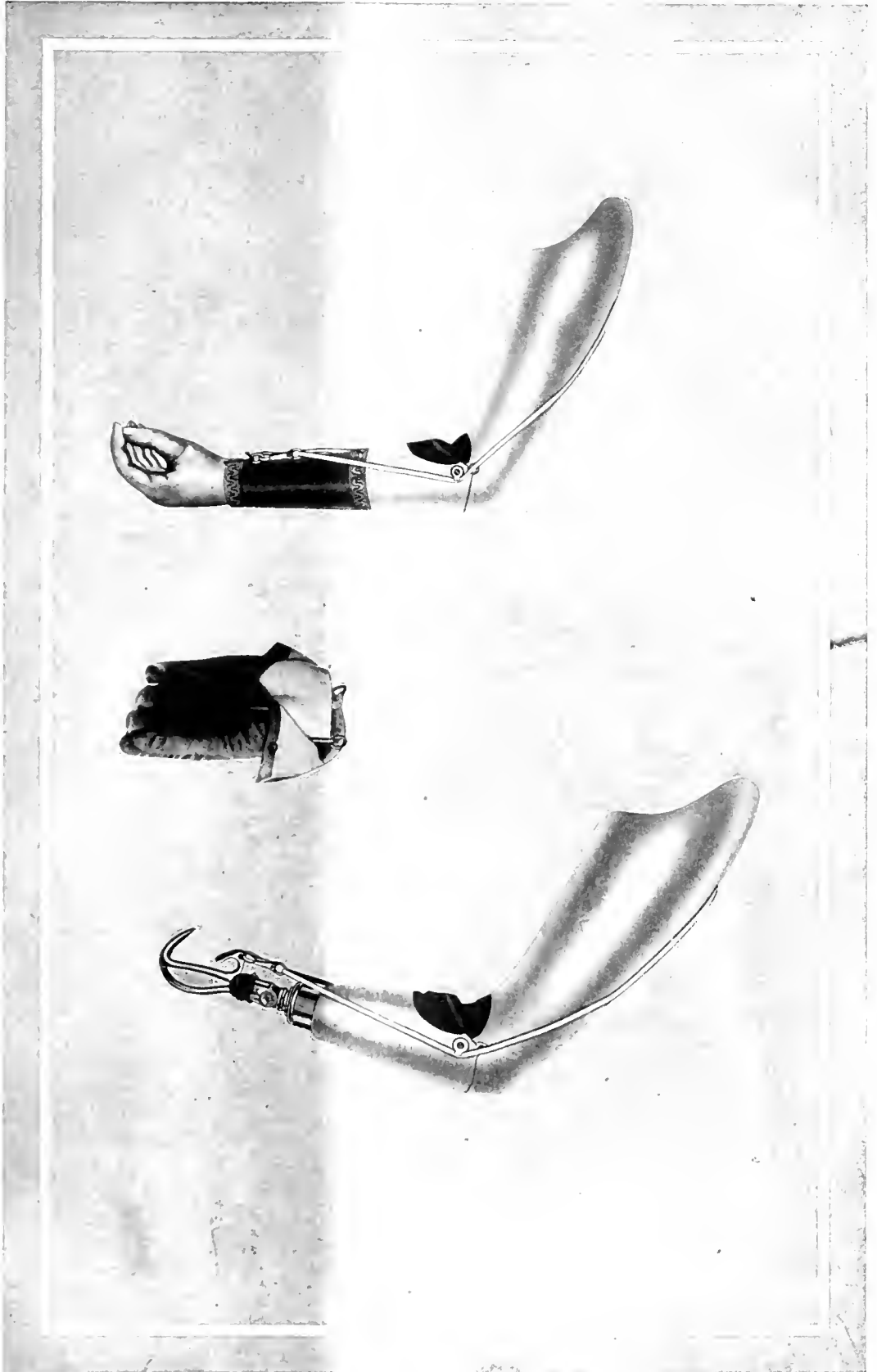
THE MECHANISM OF ARTIFICIAL ARMS

Inventors have worked faithfully on the problem of producing acceptable substitutes for the human arm, and the accompanying illustrations show some of the results of their genius and labor. The problem has many angles that must be taken into account, and many ideas have been successfully developed.

The unfortunate rich open their purses to buy the best that skill and experience can produce, and the poor man is able to purchase serviceable substitutes for lost members.

Mention has been made of government statistics of the woods reported by the manufacturers of limbs and that in these figures the limbs, crutches, and surgeons'

The surgeon's splint deserves a place in the industry. It is a wooden patch on nature's limb rather than a wooden substitute. Many woods can be worked into splints, but complete figures giving kinds and totals appear to be lacking; but one excellent wood has been listed. It is the yucca palm of California and Arizona, *Yucca mohavensis*. It is a peculiar tree, a hardwood that belongs to the lily family. It develops no annual growth rings, its trunk consisting of woody fibres and soft tissues. Splint makers reduce the trunk to veneers which are then cut in strips of the desired size. The strips look like lattice-work or coarse lace. The wood is very stiff, strong, and light, and is an ideal material for splints. The yucca is a desert tree. Its trunk may attain a diameter of a foot or more. Its dark, branches, and leaves are ragged, suggesting in appearance the extinct trees of the Carboniferous Age. Fortunately, a use has been found for the wood, other than as posts for sheep corrals near the water holes in the deserts where this palm ekes out its precarious existence. Nearly 40,000 feet, board measure, or ten times that amount if the surface of the veneer is measured, are yearly converted into splints for reducing broken bones.



splints are grouped in the same industry. It is possible to segregate the woods, with fair accuracy, according to their uses. The following table lists these woods

and the quantity of each used during an average year:

| | | |
|----------------|---------|------|
| Birch..... | 353,000 | feet |
| Maple..... | 147,000 | " |
| Willow..... | 50,170 | " |
| Hickory..... | 40,000 | " |
| Yucca..... | 39,800 | " |
| Lancewood..... | 30,000 | " |
| Rosewood..... | 10,000 | " |
| Cherry..... | 10,000 | " |
| Total..... | 686,980 | " |

The birch, maple, hickory, lancewood, rosewood, and cherry in this list are made into crutches; yucca is used for surgeons' splints, while the willow and basswood go to the limb makers. Perhaps some of the hickory is used for small pins in ankle and knee joints. Some manufacturers attach ligaments and springs to such pins.

(Editor's Note: AMERICAN FORESTRY MAGAZINE is indebted to the Hanger Artificial Limb Company, of Washington, for many of the illustrations in this article.)

THE NATIONAL ARMY AND TRAINING IN FORESTRY

BY JAMES W. TOUMEY, DIRECTOR YALE FOREST SCHOOL

IN THE rapid industrial progress of the United States during the past half century there has been an increased appreciation of the necessity for forest management if wood supplies are to be maintained in adequate amount for our future needs and vast areas of our non-agricultural lands be kept in productive condition instead of becoming areas of desolation and waste. Without scientific management woodlands rapidly deteriorate and lose their productive capacity, so much so that the yield of useful materials from them is reduced to one-third or even one-quarter that which they are capable of producing when well organized and managed.

The forests of the country embrace approximately 550 million acres or about 29 per cent of the total area. In order that the wood supply of the future may be adequate for our needs all of this vast area, with the exception of the comparatively small part capable of development for agricultural use must be maintained in forest and organized for protection and permanent economic management. Although the progress made by the U. S. Forest Service, the forestry departments of the several states, educational institutions for training in forestry and local forestry organizations has been considerable in recent years, as yet only a beginning has been made and we have a long way to go before there is at large a real appreciation of forestry and the need for its application on our absolute forest land, which is one of our great basic resources if this land is maintained in reasonable productivity and continues to perform its just function in our economic development.

Not only is there great present need for a wider knowledge of forestry and its application by those living on the land, due to the necessity for insuring a necessary future supply of wood but due also to the importance of vast supplies of timber in national defense. The world war has shown more clearly than ever before the dependence of modern warfare upon timber. The forest capital of France has been of prime importance in the defeat of the Central Powers. Modern war is a conflict between national resources brought into use by the contending armies. The country without these resources, of which wood is one, is defeated before the battle is begun.

The great and far reaching opportunity presented for industrial and technical education in the American army during the long period that must necessarily ensue be-

tween the declaration of peace and re-embarkation must be utilized to its fullest extent. The plan now in progress of organization under the auspices of the Y. M. C. A. is in the hands of a commission in whom the American people have the highest confidence. It is the function of this commission, assisted by eminent educators, to determine the character and extent of the facilities placed at the disposal of the soldiers of the American Army in France. In providing the facilities for education in the army forestry training should be given a conspicuous place.

In all probability when peace terms are signed there will be an American army in France of one and one-half million men or more. It will likely take many months to return these men to this country and fit them into industrial and other work. Of this number between five and six hundred thousand were recruited from the land, where they were engaged in the production of farm and forest crops and likely will want to return to the land after the war. Most of these men have some knowledge of agriculture but few have a real appreciation of forestry and the possibilities of its development in their own communities. It is believed if educational facilities in forestry are approved a considerable proportion of the army recruited from the land will avail themselves of the opportunity to gain a knowledge of the subject adequate to apply its principles to the future management of the woodlands in their respective communities. In the writer's judgment no equal opportunity has heretofore arisen to stimulate the practice of forestry in this country.

The inquiry naturally arises if forestry education is provided for those members of the National Army that desire it during the period between the declaration of peace and re-embarkation, can the instruction be made of such a nature when given in France that it can be applied in this country and be of real use to the returning soldiers? It is believed that the instruction in forestry should be definitely organized and for the greater portion of the soldiers electing this study, it should center in silviculture, namely, the methods of handling the forest in order to attain successful natural or artificial regeneration and the improvement of the stand through the various methods which add to the quality or yield of the product. Emphasis should be placed upon forest protection and there should be a course of lectures upon the place of forestry in our national life and in our economic

development. For the most part the instruction should be in the form of field work under personal supervision by practical foresters. In this connection it may be added that French forests, due to their long period under management, afford much better illustrations of the results of silvicultural treatment than forests in this country, none of which have been organized for forest management except in recent years. In the forests of France that have not been destroyed or seriously over cut or injured due to the war may be found every stage in the life of managed stands. The results of silvicultural operations executed in the past are expressed in the present condition of stands. For the above reasons selected French forests are admirable for demonstrating on the ground the results of every phase of silvicultural treatment.

The large numbers of American soldiers that will elect the study of forestry if opportunity is afforded will not only have a vast and far-reaching effect on forestry in this country but the work can be made to perform a large service in rehabilitating many of the forests in France that have been injured or destroyed by the war.

If the instruction in forestry provided for the army serves its best purpose it should consist largely of field work under supervision, where the men are taught the art of forestry through the actual performance of work in the woods. The field work necessary in the conduct of the training can be made not only of educational value but its importance to France should be fully appreciated. Not only can improvement work be carried out in forests now existing but many of those destroyed by war can be replanted as a part of the field work. As a practical illustration, if but 20,000 soldiers out of the one and one-half million or more men that will likely be in France at the close of hostilities should elect to study forestry prior to re-embarkation, this body of men in pursuit of their practical experience in forest planting could plant approximately 10 million trees in a single day and thus reestablish stands of timber on at least 8,000 acres of devastated France. It is assumed that the planting stock available in France for artificial regeneration is so limited in amount that it would be desirable to supplement it by suitable stock available from this country. Last spring the Pennsylvania Department of Forestry through the Governor of Pennsylvania offered to the French Government a gift of four million forest tree seedlings from the State Forest nurseries. It is believed that at least 10 million forest tree seedlings are available in the forest nurseries of eastern United States, many of which are suitable for planting in France. Those suitable for foreign use and growing in state or other publicly owned nurseries can very likely be secured for overseas use at little or no cost.

More than 1,400 American foresters are now in the United States Army in one capacity or another. Approximately one-half are graduates of forest schools or were students in forest schools when the United States entered the war. It is evident that if the instruction in forestry provided for American soldiers is organized with foresight and definitely planned for without delay

and the American foresters now in France organized into a teaching staff to take charge of the work at many centers as soon as peace is declared much can be accomplished of real value to the soldiers themselves and of great future value to this country. At the same time a vast work could be performed in the rehabilitation of French forests.

SALE OF OF SURPLUS FARM TIMBER ADDS TO CASH RETURN FROM LAND

TEN helps in marketing woodland products, summed up in the accompanying chart, should be carefully considered by those desiring to sell timber. These aim to bring the producer in touch with the consumer so as to market as direct as possible. High-grade logs of white oak, yellow poplar, red gum, ash, cherry, black walnut, etc., in most cases can be sold direct to the manufacturing plants, although located at considerable distances. Local wood-using plants usually buy in lots as small as wagon or truck load, but not less than a carload lot can be sold profitably for shipment.

In most sections of the South the farms have sufficient woodland for the best welfare of the farm, but in a few districts like the "black belt" and intensive tobacco grow-

TEN HELPS IN MARKETING WOODLAND PRODUCTS

1. Get prices for various wood products from as many sawmills and other wood-using plants as possible.
2. Before selling, consult neighbors who have sold timber and benefit from their experiences.
3. Investigate local timber requirements and prices. Your products may be worth more locally because transportation is saved.
4. Advertise in papers and otherwise secure outside competition.
5. Secure bids if practicable both by the lump and by log-scale measure.
6. Be sure that you are selling to responsible purchasers.
7. Get a reliable estimate of the amount and value of the material before selling.
8. Market the higher grades of timber and use the cheaper for farm purposes.
9. Remember that standing timber can wait over a period of low prices without rapid deterioration.
10. Use a written agreement in selling timber, especially if cutting is done by purchaser.

ing sections, the timber has been mostly cut, and owners are obliged to buy firewood and lumber, posts and rough timbers for the upkeep of their farms. Where there is an excess of wooded land and growing timber above the permanent needs of the farmer timber becomes an important product, to be sold in many cases from land cleared to make openings for more field crops or pasturage. The farmer's interest centers naturally in the conservation and disposal rather than the production of timber. Much of the grown timber was on the farm when the present occupant came into its possession. In the case of the ordinary field crops and live stock, however, which mature in from one to three years, production usually is the prime consideration.

CONTROL OF PRIVATE FOREST CUTTING

BY W. DARROW CLARK

PROFESSOR OF FORESTRY AT THE MASSACHUSETTS AGRICULTURAL COLLEGE

FOR the last two decades foresters and other advocates of forestry have talked and written abundantly on the various arguments favoring the cutting of forests in accordance with forestry principles, with a view to the future crop.

Are we not now offered the psychological time to pause, take account of results, and determine whether or not our past methods have been justified by these results?

So far as I am able to observe, the amount of privately owned forest land which has been cut in accordance with the teachings of forestry forms a very insignificant total when compared with the amount which has been cut in the same old "devil may care" way.

Although the writer does not possess the data necessary for competent judgment as to the results obtained on National Forest timber sales areas, yet he feels safe in assuming that in so far as they have been cut in accordance with the rules of the United States Forest Service, they have at least served in the nature of experimental cuttings made with a definite purpose and for obtaining definite results in the future crop. As such they will serve as stepping stones to better practice, while the cuttings on private lands can serve only in a haphazard way.

What, we may ask, is the reason for such a situation? The reason is both simple and apparent.

In the one case, the method of cutting was directed by Government experts. In the other case, the method of cutting was directed by the private owner, who very clearly lacks sufficient interest in the future condition of his forest possessions.

How, then, can the method of cutting on private lands be improved? Is the answer, "By Government Control?"

Certainly the current tendency is for the Government to step in and direct wherever private and public interests conflict.

Abstract principles affecting the rights of individuals have been suspended. Corporation owned railroad property has been taken over and is now being operated by the Government. Manufacturing plants and their output have been commandeered. The quantity of certain foods, and the quantity of fuel which the individual may consume has been limited. The amount of profits which may be made, and the amount made which may be re-

tained has been definitely limited. Verily, even men are drafted bodily and directed to do thus and so, and to go here and there. All this has been done for the welfare of the republic. Government direction of cutting on private lands will be in the direction of this tendency. Government ownership is not prerequisite. The United States Forest Service logically would be the directing center. The Eastern part of the country can be divided into districts, irrespective of State lines, similar to the western districts. A district office in charge of a district chief can be established in each eastern district, together with a corps of assistants. No cutting on private land would be permitted until the owner had made application to his district chief, and the chief in turn had specified the manner in which the cutting should proceed. In other words, the cutting would all be done under Government control just as is done on the National Forests.

Naturally, under this regime the office of the individual State Forester would become superfluous. In many cases there is little doubt that he would simply be taken over by the U. S. Forest Service. The State Forester would thus be freed from local political control, and accordingly he would be very much more independent in carrying out his policies for the best forest results. It might seem advisable in many cases to convert the State Forester's office into a State City Forester's office to direct shade tree and park work throughout the State. But these are the details. Is not the time ripe for some agitation as to the advisability of the adoption of this policy?

Let us have no misunderstanding as to what is the end sought, and what is the means to that end. Better conservation and reproduction of our forest resources is the end sought, and government control of all cutting is merely the means by which we may possibly attain it. It was never more apparent than now that the bone and sinew of a nation, its recuperative power, its power to come back after a devastating blow, lies largely in its natural resources. It behooves every man, woman and child of our nation to take heed of this fact. It is directly up to those who know what the present situation and tendency is to stand by their guns and to send this idea home to the people.

**WHEN YOU PLANT A MEMORIAL TREE WRITE AND TELL THE AMERICAN
FORESTRY ASSOCIATION, WASHINGTON, D. C.**

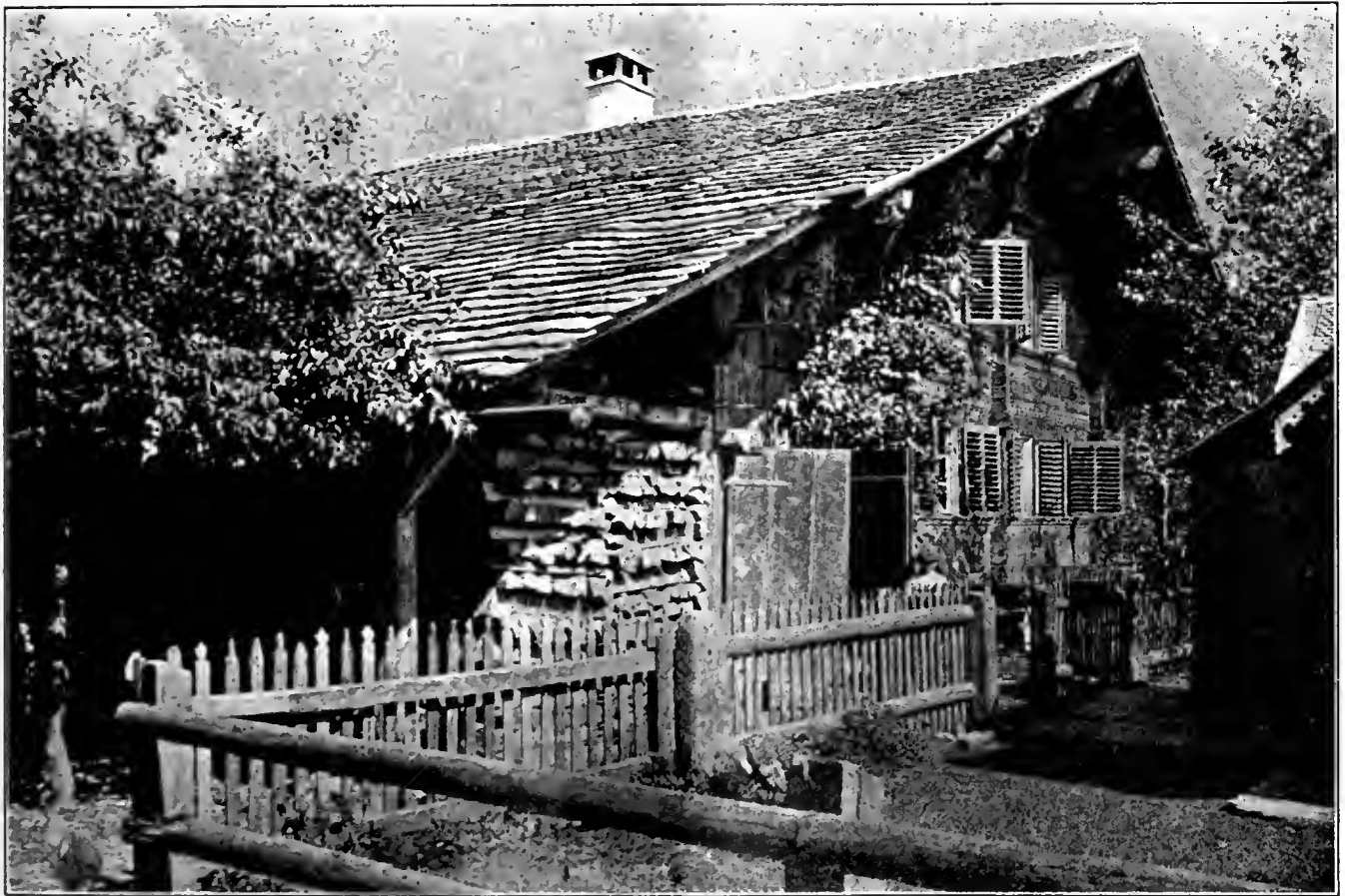
RENASCENCE OF THE MODERN MEETING-HOUSE

BY JOY WHEELER DOW

THERE is, at least, one bit of classic architecture that fits into the American landscape, perfectly.

It is the wooden, Colonial Meeting-house. Originally good in its conception, good in the honest application of American forestry to its lines and proportions, without the mistaken idea of counterfeiting stone-work, and invested now by three centuries of American history with irresistible personality and magnetism—who is not gladdened to see its spire and gilt cockerel shimmering afar in the glorious sunshine of America, as it

strange to say, there is no more danger of fire from the wiring and all our modern inventions which tamper with fire, and make insurance policies necessary even for those who dwell in monolithic concrete dwellings. The old Colonial dwellings rarely burned down. Then, there is the wide range of selection—different kinds of wood for the different parts of the building. Spruce and yellow pine are not the only framing material, although, white pine, I believe, is best for door and window casings, outside doors, cornices and mouldings.



A COLONIAL HOUSE IN SWITZERLAND
Gothic grammar correctly expressed in wood.

dominates the cluster of elms or maples of the village common in the middle distance of a picture of matchless rural scenery?

Besides these sentimental considerations, what kind of a building is more suitable for an all-the-year-round proposition in our land, than one constructed out of some kind of sound and time-resisting species of wood selected from our splendid native forests? A non-conductor of temperatures, a wooden building further insulated by back-plastering and double paper lining, is snug and warm in winter, cool in summer, while it harbors none of the insidious dampness which is apt to linger, at all times, in a house constructed of massive masonry; and

This should be leaded with a white lead base. Weatherboards, where there is an alternate choice of using cedar, cypress or some other wood, may be left entirely without paint, as was done in the Jacobean-Colonial dwelling called "Keepsake" illustrated in the March number of "American Forestry."

The first colonists had no paint, the few houses of that period remaining having withstood the vicissitudes of three hundred years without its help and for this reason it has always seemed to me, as a matter of personal choice, that it would be a good rule today never to stain or paint wood, obscuring its beautiful grain, if it can be avoided.

For the interior of our home, we may introduce the hardwoods—like oak or chestnut for the exposed ceiling timbers and partition timbers. Oak, maple and yellow pine play an important part for floors, only do not try to imitate the floors of bowling-alleys with excessively



THE EXTERIOR OF THE BUILDING

All Souls In The-East, Unitarian Universalist, and voted by the Architectural League of New York the ideal meeting-house of America.

narrow strips such as mill men often recommend in order to divide the inevitable shrinkages of their half-aged product as much as possible. Poplar is best, in this section of the country, for white paint and enamel trim, because the grain and color of the pieces are hard to match, while it is a soft wood requiring some protection. The Summit, New Jersey, Meeting-house illustrated, is trimmed with poplar, capped with birch rails. There are three-ply, built-up, birch doors, and a birch casing for the renaissance organ, all birch being cabinet finished, but without a particle of stain, depending solely upon time for deepening the tone values.

White paint is a bit harsh for the exterior of a meeting house as rich in architectural detail as is this one, and in a city or large village, it soils too quickly and streaks horribly. There is, moreover, an indefinable charm imparted to Colonial buildings by soft browns and drabs. I cannot tell you why; but a subconsciousness suggests reminiscences of the subdued and grateful tones incident to the Italian travertine, as one reason, while another, possibly, is suggested by memories of the delightful belfry of old St. John's which presides over the docks of Portsmouth, New Hampshire, also the brown steeple of St. John's and St. Paul's, respectively, in New York City.

And then, there come to mind the splendid old mansions in the neighborhood of Benefit Street, in Providence, Rhode Island, and along Federal Street, in Salem, Massachusetts, all in brown color schemes, mostly monotonous, depending upon richness of detail for contrast and shadow. I may tell you, however, why the new Meeting-house at Summit was placed, apparently, with its back to the street. It was done for a certain and irresistible dramatic note in the setting that nothing else would produce. The theory of Orientation played no part.

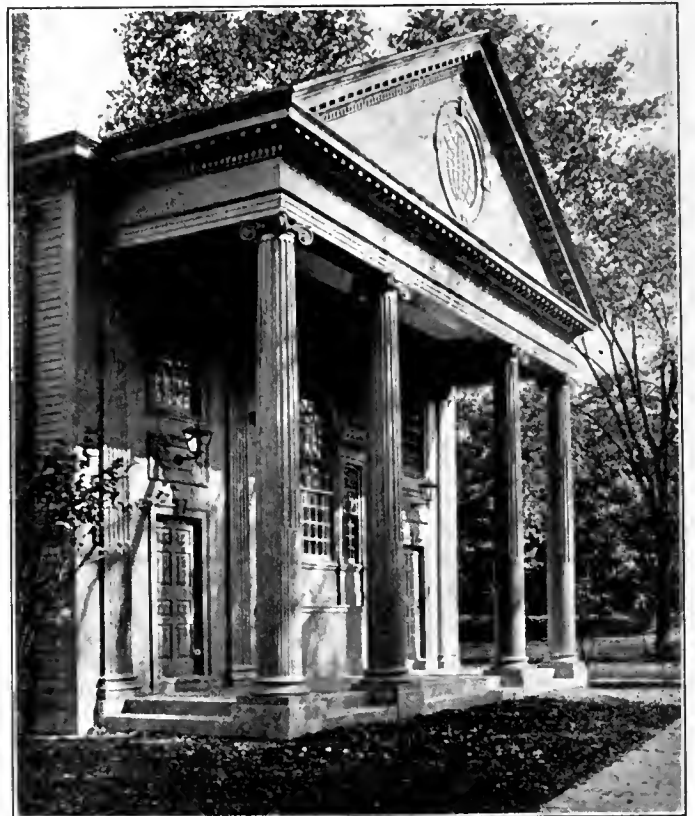
One is little prepared for the religious perspective which greets one upon entering the Meeting-house from Waldron Avenue—the main entrance. People remark the high pulpit with its sounding-board, the lectern, the chancel, the altar over which it is easy for the imagination to descry a sanctuary lamp dimly burning. There is even a faint suspicion of incense in the atmosphere, which however, is nothing but a certain historic haze the architect of the building has artfully produced, rather than services in which acolytes have taken part. Conventional manners and reticence are likely to give way to the heart-to-heart question—

“And pray, what kind of a church is this, anyway?”

“It is the Unitarian Meeting-house.”

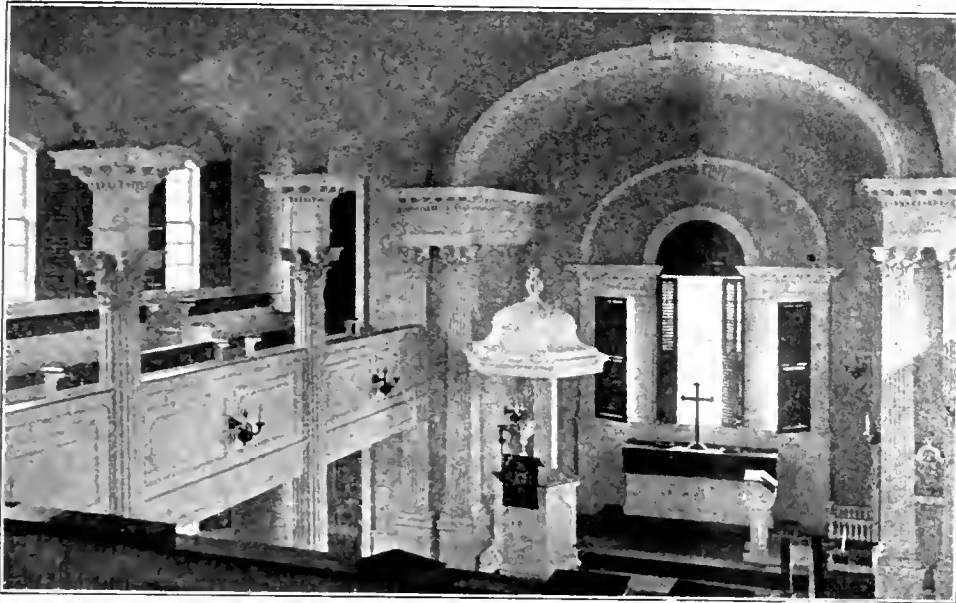
“What are you saying?”—and tableau of consternation!

Yes, it is difficult—very difficult for an architect to design a Unitarian Meeting-house. The requirements are so exacting. Strange as it may seem, it is the very symbols of some of the densest of religious superstition



THE NEW MEETING HOUSE

The old time hallowed atmosphere of the great portico.



THE INTERIOR FROM THE ORGAN LOFT

The feeling in this picture is hard to describe, but "homilies were in the air"—the quiet and peace of a blessed place.

that go toward making this Meeting-house so awfully fetching. They all help to make us kin with Christian worshippers of past centuries; and that is something the human mind must have—companionship. In a Unitarian



THE LECTERN

The simple dignity of the high pulpit with its sounding-board, the Renaissance lectern and the approach to the chancel.



THE HIGH PULPIT

The sheer beauty and purity of the decorative treatment of the interior of the new Meeting House is plainly felt in these two pictures.

meeting-house the wooden roof-tree is the best kind of an introduction to anyone you meet beneath it. You may claim anyone's acquaintance.

If you have committed some utterly unnecessary sin of the heart, you had better not come to church at all until the foul crime, whatever it be, is made good, or is "burnt and purged away," until, indeed, you may return to the old, square pew of your pious forefathers, with their wonted sense of receiving a kind of Marconigram from heaven, which deciphered reads—"Well done, good and faithful servant, enter thou into the joy of thy Lord." For a Unitarian meeting-house has neither nook nor cranny where an evil deed may bestow itself and say that it is safe. There are no expiatory waste-baskets. The dyed-in-the-wool Unitarian is always the son in the field, never the

returning prodigal—the son who says to his father—“Lo, these many years do I serve thee, neither transgressed I at any time thy commandment; and yet thou never gavest me a kid that I might merry with my friends” and goes to church rather for the comforting reassurance, in lieu of a surprise party and fatted calf—“Son, thou art ever with me, and all that I have is thine.”

Hence, the architect of a successful Unitarian meeting-house must, by subtle architectonic expression, set forth the scenario of the faith—that, in spite of the terrible handicap that has been placed upon poor human nature, even though God either cannot or will not be merciful to all men from the human standpoint, we can be, and intend to be, though indeed it demands, as Robert Louis Stevenson says on the illuminated cards—“all that a man has of fortitude and delicacy.”

The architect must make the world appear less tragic than it is, by a meeting-house at once distinctive and graceful, one whereby we may forget for the moment that there are some very disagreeable things in this beautiful world to conceal. He must have the atmosphere produced by agnes of Unitarian sacrifice and devotion. He wants to inclose some holy ground that those who habitually wear muddy shoes, may be seeking the

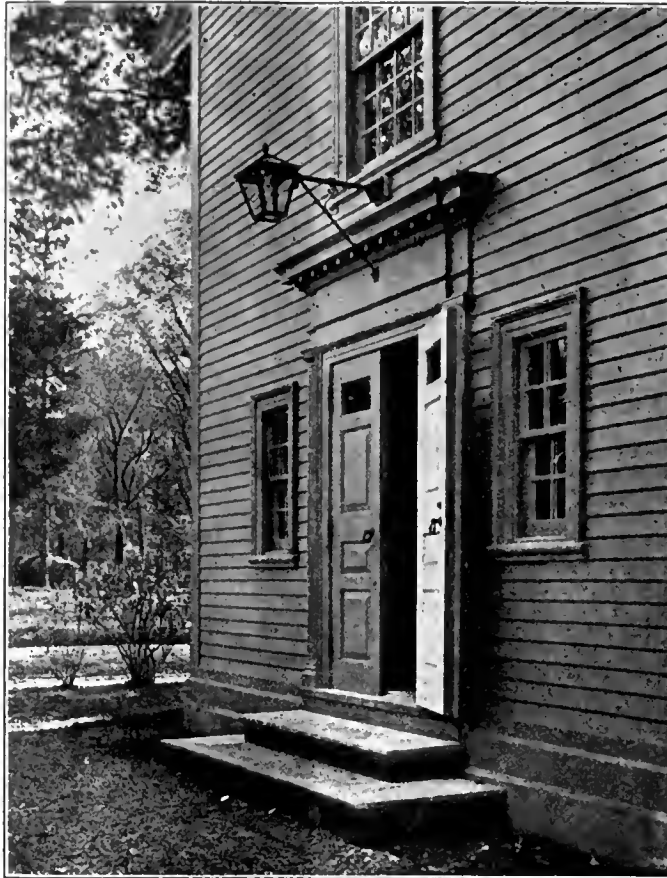
old-fashioned scraper at the threshold. He wants the feeling of great age and veneration in his building, for the confidence in our good deeds it inspires. He wants

the tranquility of twilight for the flood of memories and historic associations that come with it. He wants to make believe that the meeting-house is a restoration rather than a new building, and that it has already stood upon its site for a century or two, that the old square pews have remained the property of the different families for generations, still with enough and plenty to go 'round (even if there really isn't) universal respectability and bienseance. He wants to make believe that there is no grim want to dishearten us, are no skeletons to be ashamed of, no black sheep to dread, no don't-miss-anything relatives to scandalize, no militarists to organize, harness and drive the weak-minded, no pacifists, and that when Sunday mornnig' comes again, we are free to repair to the same old pew where our father, grand-

father and great-grandfather knelt, before us, glad to join in the responses and litanies as of yore—

“O God, who by Thy Son hast redeemed the world—”

And these are the spiritual needs we have endeavored to meet by the art of the new meeting-house.



THE ENTRANCE

This photograph reproduces faithfully the detail of the entrance—beautiful in its simplicity, homelike and inviting.

SECRETARY HOUSTON URGES PROTECTION OF THE FORESTS

GREATER conservation of wood and wood products through protection of the raw material in the forests of the United States, is urged by Secretary Houston, of the Department of Agriculture. The secretary's annual report also advocates provisions for pushing more rapidly the improvement work in the forests, for a greater number of forest guards, and for earlier organization each fire season of the protective system.

It is declared that protection of the forests during the present year proved an exceptionally difficult task. An annual strain was imposed on an organization somewhat depleted in numbers and much weakened by the loss of many of its most experienced men. Added to this was the difficulty of securing good men for temporary ap-

pointment as guards during the fire season, and parties of men for fighting large fires. An unusually early and severe dry season caused the outbreak of serious fires before the summer protective organizations were fully ready.

The Department declares that some embarrassment in meeting the situation was caused by the failure of the annual appropriation act to pass Congress until after the fire season was virtually over. Relief was furnished by the President, who placed \$1,000,000 at the Secretary's disposal as a loan from the President's emergency fund. It may be necessary, the Secretary says, to seek from Congress again a deficiency appropriation of \$750,000.

ALPHABET GROWN ON TREES

BY H. E. ZIMMERMAN

IN the course of a number of years Mr. E. A. Miles, of Clifton Springs, New York, has collected one of the most unique alphabets in existence. In addition to the letters of the alphabet a complete set of numerals was also collected. The numerals and letters were all cut from trees, the numerals only having been found in the vicinity of Clifton Springs. There is but one root in the collection. In no instance have the letters or numerals been twisted into their present shape. They grew that way naturally. The letters are from the following places: A from Oshawa, Canada; B from Banff, Canada; C from near the summit of Mt. Tamalpais, California; D from Erie County, New York; E from Marilla, New York; F from Great Falls of the Potomac, near Washington, D. C.; G near Attica, New York; H near Clifton Springs,



NATURAL LETTERS AND NUMERALS

Formations from trees and shrubs growing on battineids and places of historic interest in the United States and Canada, making a complete alphabet and numerals.

New York (this letter is the only one formed from a root); I from grounds near the former home of William A. Wheeler, Malone, New York, former Vice-President of the United States; J from Grand Canyon of the Colorado, Arizona; K near Attica, New York; L from Lunday's Lane battlefield, Ontario, Canada; M near Attica, New York, while walking with his mother, a striking coincidence indeed, when it is remembered that the word "mother" begins with an "M"; N, which was the first one discovered, was found near Clifton Springs, New York; O and P were also found there; Q came from near the top of Mt. Lowe, California; R from near the Parliament buildings, Toronto, Canada; S near Clifton Springs, New York. On a visit to the tomb of Lincoln, Springfield, Illinois, Mr. Miles saw a gentleman trimming a tree near Lincoln's tomb. In one of the small branches cut away Mr. Miles saw a well-formed letter T. He got it for the mere asking. U is from Clifton Springs, New York; V from Plains of Abraham, Quebec, Canada, where Wolf died; W near Attica, New York; X on Little Roundtop, Gettysburg, Pennsylvania; Y in the vicinity of Petersburg, Virginia, where the well-known tunnel was exploded in the Civil War, and Z near Attica, New York.



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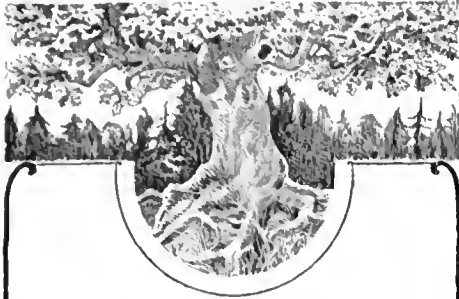
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FRAME HOUSES FOR FRANCE AND BELGIUM.

NOW is the time to promote sentiment for the frame house in France and Belgium, according to R. S. Whiting, Architectural Engineer of the National Lumber Manufacturers' Association. He points out that the people of these countries for hundreds of years have lived in houses built of stone, and know nothing of the utility and beauty of the frame home as it is known in America.

Mr. Whiting declares he is doubtful as to whether the French and Belgians will go back to the stone houses and he sees a chance for American lumbermen to inaugurate such a wood building propaganda that the people over there will learn to want the frame house.

Mr. Whiting suggests that architects in the United States who are favorable to wood construction should be immediately put to work on the task of studying French and Belgian conditions, in order to devise the best frame home for them along lines that meet their own ideas of what a home should be.

LUMBERMEN WILL AID IN RECONSTRUCTION.

THE lumbermen of the United States have pledged themselves to co-operate with all other industries and with the agencies of the Government in the reconstruction work which confronts the nation as the result of the World War. This was the decision reached at the conference held at Chicago under the auspices of the National Lumber Manufacturers Association. The sessions were participated in by representative lumber manufacturers from all sections of the United States and by organizations of lumber wholesalers and retailers.

An intimate discussion of the problems which are yet to be solved, before the country returns to normal working conditions, was the main feature of the conference. All phases of the situation were gone into and the net result was a definite program which is expected to be carried out.

President John H. Kirby of the National Lumber Manufacturers' Association declared that the conference will have far reaching effects upon the industry. The absolute harmony of purpose which prevailed and the definite plans which were adopted, he declared, were a guaranty that the industry would be found working alongside of all others in the reconstruction program for the nation.

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CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

THE forest protective associations in the Province of Quebec are keeping up their record for progress and The St. Maurice Association has decided to buy two flying boats and their equipment for use during the coming season. A committee has been appointed and tenders have been asked for. Stations for housing the machines will be built together with a centrally located machine shop for the repair of the Association's mechanical equipment, which now consists of railway gasoline speeders, automobiles, motorcycles and motor driven pumps. The motorcycles have proved a very marked success during the past season. The usual type was employed except that they were geared down and an especially heavy front fork was used. These machines can go over the roughest roads, they can carry in the side-car a motor driven pump with 600 feet of hose and are much more economical to operate than automobiles.

The St. Maurice Association has completed its season's work, having extinguished seventy-four fires which burnt over an area of 3,443 acres, or .041 of 1 per cent of the area patrolled. The total cost was 7-20 of a cent per acre and the total cost of extinguishing fires which required extra labor besides that of a ranger was \$936. Although wages and equipment cost more than in previous years the assessment per acre was not raised.

Mr. D. C. A. Galarneau, late forester for Algoma Central Railroad, has accepted a position with the St. Maurice Paper Company of Three Rivers. Professional foresters are proving their worth to the big paper and pulp companies.

On December 10th a forestry conference was held by the Canadian Forestry Association and the Members of the Government of Nova Scotia. It is hoped that as a result of this meeting a Forest Service along the lines of that lately established in New Brunswick will result. Such a service is badly needed and will be a great asset for the Province and will bring it into line with development in the rest of the Dominion.

Among the cause of fires in one of our Provinces we find "Campers and Tourists" and the list of fires attributed to them is quite large. Unfortunately a large number of these are Americans, and the writer takes this opportunity of calling the attention of all our friends who visit this side of the line in the summer to visit the

beautiful north country to the damage they do thoughtlessly. It is realized that we have only to direct attention to this matter to ensure its absolute elimination. The greatest offence is in failing to extinguish camp fires.

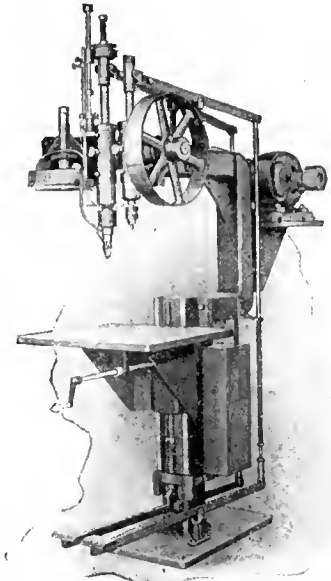
Next year the Canadian Forestry Journal will appear in a new dress and in enlarged and improved form. The Canadian Forestry Association is rapidly growing in membership and influence and its field of usefulness is constantly broadening.

Owing to the closing of munition factories the amount of labor available for woods operations has been somewhat increased and the outlook for normal production somewhat bettered. However the cut of both lumber and pulpwood is likely to be less than usual.

The plans for the opening of a new Forest Products Laboratory in British Columbia are progressing favorably and it will soon be under way. The Dominion Government will co-operate with the University of British Columbia in its installation.

The Canadian Government has started a five months course in Forestry at the University of British Columbia for returned soldiers, to fit them for rangers and for Government work. Mr. E. J. Hanzlik will be in charge of the work. The course opened November 1st and will continue until March 31st. This is a most excellent idea as the crying need has been in Canada for competent men to fill ranger positions. It is to be hoped that something of the kind can be undertaken in the East.

The work done by the new Fire Protection Service in Ontario during the past season has been excellent and shows great improvement over previous conditions. The organization is now complete and in fine running order. The equipment is complete and the system of supervision and reports excellent. There is still great danger from the new settlers in the "clay belt" owing to the rapid clearing of large areas of land. The permit system is working well, but so many fires for clearing are necessary that their rigid control is very difficult. The time has come when fire protective agencies, Government or co-operative, must take some steps toward themselves burning debris for settlers and loggers, simply as a preventive measure. If slash burning could be undertaken by such agencies instead of being left to the settler and the lumberman a



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great saving in the cost of extinguishing fires would be accomplished; and, as the cost of this work would be charged to protection instead of to logging operations, the objection of the Woodlands Departments to cleaning up the woods would disappear. It is fairly certain that if all logging slash was burnt after the operations were finished and before the danger season arrived, forest fires would almost disappear. Fires in virgin stands are comparatively rare under present protective measures. The great majority occur in cut-over land and on old burns, and these fires are extremely difficult to fight and spread rapidly over large areas. Some work along these lines will probably be undertaken next season as an experiment.

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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BOOK REVIEWS

France, the France I Love, by Dr. Du Bois Loux. Pauline L. Diver, New York City. Price, \$1.50. This is the first of the series—*My Tribute to France*—to be published by Miss Diver, and the little book greets the world most attractively bound in broad bands of red, white and blue—simulating the tri-color of France, that flag which is the triumphant emblem of a proud and simple people. In his introduction called "The Significance of France," Dr. Frank Crane says:

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"Superficial observers before this war thought that she was going down the purple path of dalliance to disintegration. They little know the depths of her resources. She has rallied magnificently.

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WOOD FOR THOUSANDS OF USES.

TWO of the outstanding results of the recent Lumber Congress in Chicago are the renewal of peace time activity in the lumber industry, and the apparent determination of manufacturers of this product that wood as a construction material shall become known in all quarters of the earth.

Not that wood is not now known—for it is. But it is proposed that it shall become known in a new way. Its utility for countless building purposes and in the manufacture of countless articles of use—that is the goal for which those who turn

the products of the forest to account for mankind are striving.

Plans are being materialized in lumber organizations the object of which is the dissemination of information about wood. It is proposed that no possible question on the point of wood utility shall be left unanswered. And all of this information is to go to the remote corners of the earth, not only in the United States, but on other continents.

In this connection, it is announced, the National Lumber Manufacturers Association has had compiled by experts pamphlets containing valuable data about all branches of the lumber industry.

IMPROVEMENT OF FORESTS

Providence Journal

The question of more and better highways in the Adirondack region is of particular interest to the motor fraternity. Touring autoists are especially interested in having the existing roads improved and new ones developed, suggests Eugene M. Travis, New York State Comptroller. The welfare of these travellers is intimately bound up with the increased accessibility for tourists, campers and settlers of the entire Adirondacks. The work of protecting the forests against fire is greatly facilitated by improved roads, enabling the prompt mobilization of men to fight fire.

OREGON TREES DISEASED

Portland Oregonian

Fir trees along the Columbia River Highway, which are turning brown, as though seared by fire, according to foresters of the United States Forest Service, are not dying, but are merely suffering from a Spring disease something like the grippe, which every spring or two attacks Douglas fir growing where it is subject to the dry, cold east winds, which sweep down the Columbia River Gorge. This rather unique local disease of the Douglas fir was recently named "parch blight" by Thornton T. Munger of the Portland forestry office.

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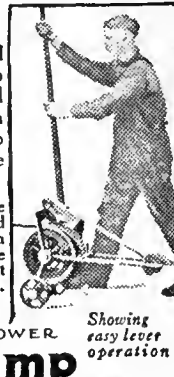


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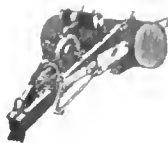
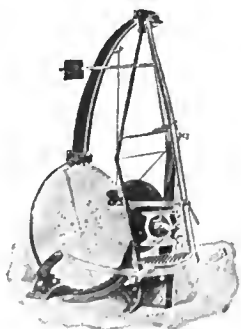
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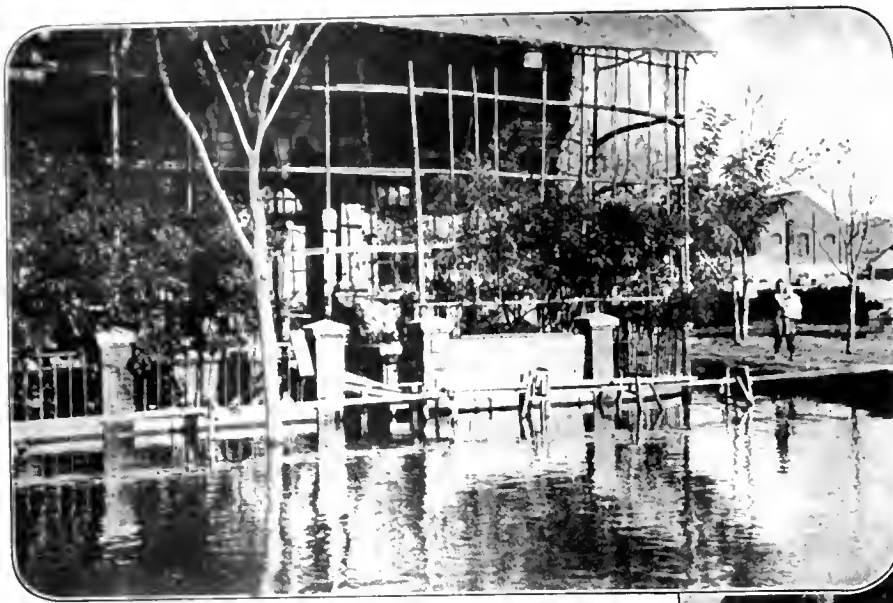
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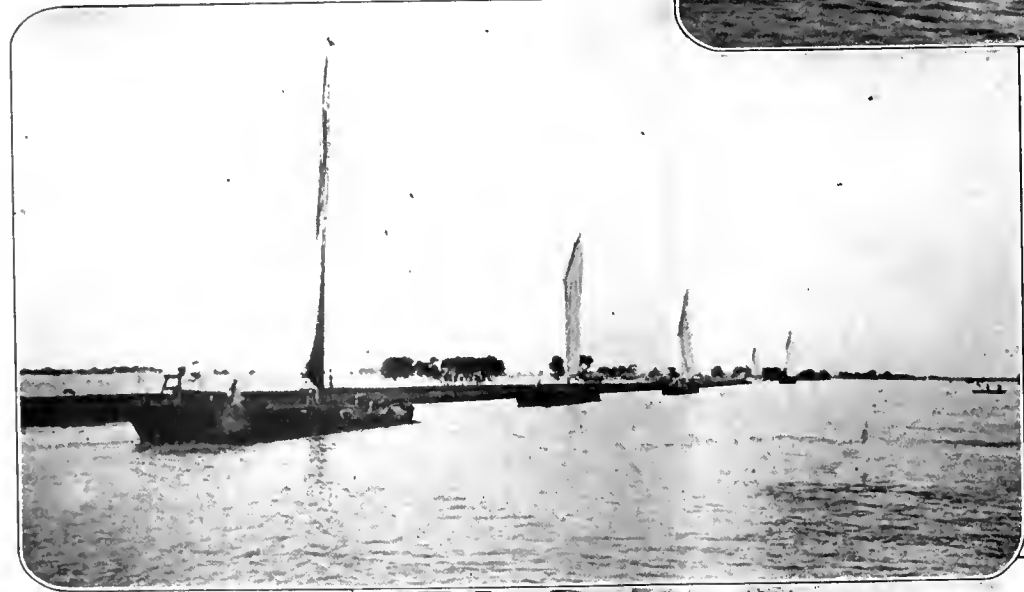
Entered as second-class matter December 24, 1909, at the Postoffice at Washington, under the Act of March 3, 1879. Copyright, 1919, by the American Forestry Association. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized July 11, 1918.

Sad experiences in previous generations taught the people the danger of building their mud-walled houses on the level plains. Consequently in this vicinity the villages generally are perched on the high spots of land, and they were only partially submerged. After many weeks the waters slowly subsided, and here and there in the distance a few trees could be seen, or a forlorn village



North China Flood Pictures

IN Chili Province, south of Tientsin, the dikes on either side of the Grand Canal gave way. Hundreds of square miles of land were submerged. We left Tientsin and traveled by steam launch over flooded fields a distance of thirty miles before reaching the broken end of the



standing partially above the waste of waters.

Greater Tientsin is divided into a number of foreign settlements or concessions—Japanese, British, German and Russian—all outside of and separate from the real Chinese city of Tientsin. Large portions of these concessions were flooded, with water over the first floor of the houses. —Photographs by courtesy of Mr. Frederick R. Sites.

Tientsin-Pukow Railway. Parts of the dikes remained standing slightly above the water level, and at these places the boatman utilized both man-power in towing, and wind power on their sails to move the heavily laden cargo boats. Disease and epidemics threatened. A mud rush was made to get rid of the flood waters. Temporary dikes were rapidly built along the boundaries of the various concessions. The woman carrying the baby is walking on one of these dikes.



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FORESTS AND FLOODS IN CHINA

BY HERMAN H. CHAPMAN

PERHAPS no phase of forestry has aroused so wide a public interest as the influence of forests upon stream flow. For over a century, the governments of modern nations, notably France, have proceeded on the basis that the denudation of mountain slopes caused ruin by unleashing the demons of flood and erosion, and that the only effectual means of control were reforestation of these slopes, combined with artificial barriers in the beds of the torrents. And the only possible method of bringing these great projects of restoration and protection to a successful conclusion has been found to be national control.

While France, under the constructive national forces of the republic, has gone a long way towards correcting the evil of denudation which followed the rampant individualism of the revolutionary era, America has been

struggling towards a realization of the same truths. For over a century, not counting the colonial era, our nation took no effective steps to safeguard the public interests represented by the protection belts of forested mountains from which our rivers take their rise. Finally, the principle of national ownership and control was won, both in the west and the east, and we are buying back the lands in the Appalachians and White Mountains which passed from public control under a thoughtless and exaggerated individualism.

Meanwhile, China has been the principal sufferer from floods due to deforestation, and the best and most convincing examples of the devastation and ruin caused thereby may be studied in the great plains of north central China, whose rivers rise in steep mountainous country, which has been converted by unchecked forest



Courtesy of "Asia"

THE GREAT WALL OF CHINA

Looking out over the barren hills, one subtly feels that "immemorial mystery of North China, wrapping Peking like an imperial purple mantle, a somber northern inscrutability enfolding the Great Wall as impenetrably as the mists obscuring its turrets."

exploitation into barren slopes devoid of vegetation.

It remains for an educated and keen minded Chinese forester, Dau Yang Lin, a graduate of the Yale Forest School at New Haven, Connecticut, and a pioneer in the awakening of new China, to present these facts to the world in a manner thoroughly convincing.

Mr. Lin is connected with the University of Nanking, and has devoted his entire time for three years to studying the effects of floods and the influence of forests on their control. In



A RIVER BED IN SOUTH MANCHURIA

Broad and stony, with almost no water, this shows clearly the evil results of deforestation. The region is also notorious for the many robbers which infest it.

Photograph by Frank N. Meyer

a pamphlet prepared by him and issued by the Chinese Forestry Association, entitled, "Forests and the Chihli Floods," he sums up the evidence. Mr. Lin does not rely on his own judgment, but quotes from the published statements of many prominent engineers, none of them foresters (until within a few years there have been no foresters in China), in support of his conclusions. These are:

1. That the river channels in the Chinese plains are incapable of carrying



ARTIFICIAL TERRACING

A striking picture taken in Shansi Province, China, showing other deforested mountains with artificial terracing to prevent further erosion.

to the sea the enormous discharge of water in times of flood.

2. That this condition is tremendously aggravated by the great quantities of silt carried down by the torrents, which the streams are forced to deposit as soon as their velocity is checked by the low gradient of the plains.

3. That it is impossible ever to improve these channels by deepening or by levees so that they will carry these floods and silt.

4. That the volume of water and silt must be diminished at its sources in the mountains, so that not only will the flow be extended in point of time and diminished in velocity, but that by so doing the carrying power of the stream will be proportionately lessened and the load of silt diminished.

5. That there are but two means of securing this result—the erection of barriers, dams and reservoirs, and the reforestation of the denuded slopes.

6. That the construction of dams and reservoirs is not only enormously expensive, but will *not solve* the problem, since these reservoirs will rapidly and completely fill up with silt, requiring their renewal perpetually.

7. That the reforestation of the slopes offers the only hope, and the most practicable method for checking this

erosion of soil, and that without reforestation the plains of China will continually be subject to floods of greater and greater severity.

Few of us have any conception of the problem which the Chinese have brought upon themselves by their shortsighted destruction of these mountain forests—a result due directly to the complete absence of government ownership and control of these lands and by the exercise

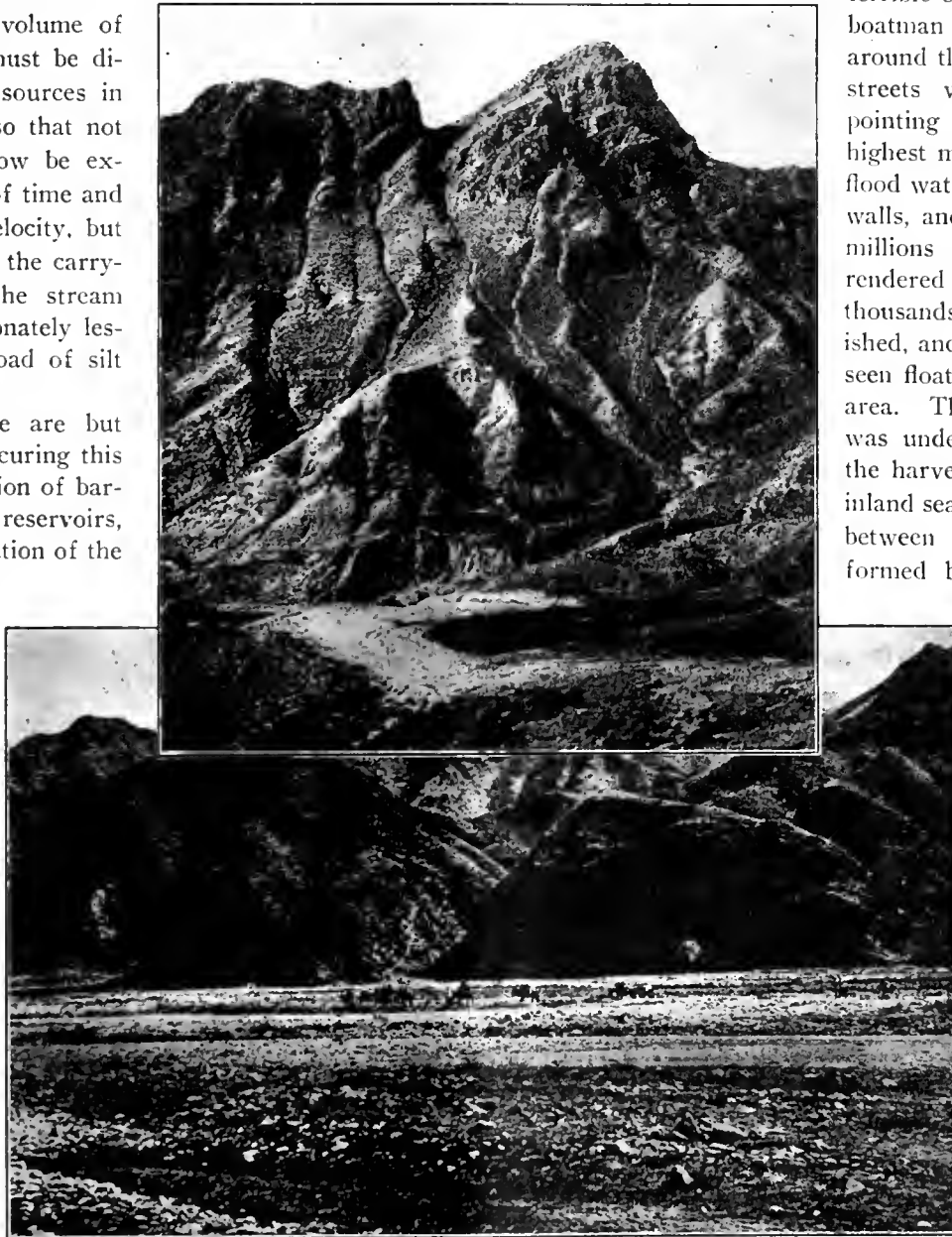
of the rights of private individuals to do as they pleased regardless of the welfare of the nation or posterity.

The brief account given by Lin of the great Chihli flood of 1917 may visualize the tragedy resulting from this selfish shortsightedness.

“While in Tientsin during the months of November and December of 1917, I had the opportunity of going through the flooded sections of this city, and it was a

terrible sight indeed! The boatman who took us around through the flooded streets would indulge in pointing out to us the highest marks made by the flood water on the different walls, and also tell us that millions of natives were rendered homeless, that thousands had already perished, and that coffins were seen floating in the flooded area. The country which was under crop ready for the harvest is now a great inland sea with boats plying between points or islands formed by rising ground.

The damage that has been done to crops and houses, the loss caused by stoppage of trade, interruption of railway traffic on the Peking - Hankow and the Tientsin - Pukow railways—this has been estimated at hundreds of millions of dollars. It is further estimated that in the city of Tientsin alone there are more than 120,000 flood



TYPICAL SCENES IN CHINA

Taken in Wu Tai Shan, Shansi, the upper picture shows starkly naked mountains, completely deforested, while the lower picture shows the consequent erosion at the foot of the hills and a caravan crossing through the dry river beds.

sufferers, but thank goodness, most of these sufferers are being properly taken care of by different organizations and for their shelter thousands of mud huts have been put up.

“According to the latest report of the general Relief Committee, which gives detailed information of each of the hsien that has suffered from the floods, we learn that there are altogether 103 hsien or 17,646 villages affected



Photograph by Frank N. Meyer

ABOVE THE CITY OF CHIEH CHOU

View of the deforested mountains and the big dike the people have built to prevent a small mountain stream, which carried down much mud and stony debris from over-running their city.

by the floods, and that in these hsien there are as many as 5,611,759 sufferers who are either homeless or starving.

"When we come to think of prosperous and peaceful Switzerland as having a population of only 3,425,000 and an area of 15,975 square miles as compared with 5,611,749 sufferers and 15,000 square miles of flooded districts here, we at once comprehend the severity and the extent of devastation by the floods; and it is no wonder that they have been called phenomenal floods or something that Chihli province *has not experienced for the last 170 years.*

"Dr. P. E. Licent, a well-known scientist, who conducted perhaps a more scientific investigation through the flooded districts than anybody else, said: 'It is to be



Photograph by Frank N. Meyer

VIEW FROM THE LARGE DIKE

This looks over the city of Chieh Chou, Kansu, China, and shows how much lower the streets are than the brim of the dike. By digging a small canal and by reforestation, the situation would be enormously improved.

feared that next fall there will be another big flood around Tientsin, because the five rivers in this province are badly silted up and the embankments are in bad repair. For instance, along the Tze-ya Ho from Sienhsien to Tientsin, I saw twelve places at which the embankments are broken. Now it is on account of a long continued deforestation which has deprived the different watersheds of their protective covering that all these rivers have become silted up.' Then pointing to the map, he continued: 'I was traveling in the mountains near Paotingfu last August, and I saw hundreds of corpses washed down with houses, dead cattle, bowlders, etc., by the terrific torrents. In one place called Tai Lun Mung near Chocho, I saw eighty-four corpses floating gruesomely on a little pond. The terrible mountain torrents must have been responsible for such a state of affairs. China cannot hope to harness her water or regulate her streams until these torrents are stopped and to stop them permanently a systematic program of reforestation must be carried out.'"

The conditions caused by these floods tend to become steadily worse, as indicated by Dr. Licent. The river



Photograph by Frank N. Meyer

THE HIEI SHUI KIANG OR BLACK-WATER RIVER

It passes the city of Chieh Chou and runs along mountains which have been totally deforested. As a result many landslides take place in the rainy season and the city is always in danger of being destroyed by the river.

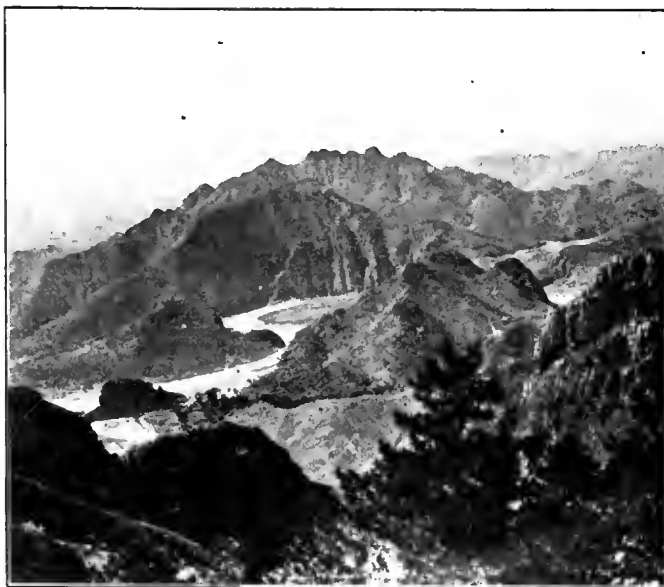
beds become completely filled with great masses of sand and silt, and the mountain slopes become furrowed into deep gullies through which the torrents roar in foaming, boulder strewn crests after every downpour. Mr. Lin cites the well known physical law that the carrying power of water increases as the sixth power of its velocity, so that an increase to ten times the rate of flow multiplies the power of the stream to transport mud and rocks by one million. This detritus in turn tears out and deepens the gullies, thus concentrating and increasing the velocity of the water. The vicious circle thus established has the most appalling results, and the devastation by a single flood of an area whose population and resources are equal to Switzerland, is the logical consequence.

Among the many citations quoted by Mr. Lin to show that reforestation alone offers a permanent solution of

these evils which threaten to destroy whole provinces, is that of Mr. H. Vander Veen, C. E., consulting engineer to the Natural Conservancy Bureau, Peking.

"As long as the slope of the water level is such that a current can be maintained strong enough to carry all the matter held in suspension along, no harm is done. But the natural slope of the plain is, for several rivers, insufficient. In such a case the river is therefore forced to get rid of the soil, held in suspension, along its way, consequently its bed gets raised and in the long run the river has to find another course, which it does by bursting its dikes to find in the lower lying land the place where it can deposit its burden, which it could carry no longer and for which no more room could be found in the old bed. This is the case more or less with every river running through the plain of China.

"The only way to diminish this evil is to diminish the amount of soil brought down from the mountains. And the reason for this enormous quantity of silt coming down from the mountains is that those mountains are bare so that during a heavy rain nothing prevents the water from rushing downward practically immediately after it has fallen, taking with it large quantities of soil.



Photograph by Frank N. Meyer

INSPIRING MOUNTAIN SCENERY NEAR SHAN HAI KWAI, CHINA

At the base of the mountain in the foreground of the picture a little growth of pine trees may be observed, otherwise all vegetation has been removed by the Chinese.

flow of the water, as has sometimes been suggested, is not only far too expensive but moreover wrong *as it does not do away with the problem of silt*. Sooner or later these reservoirs would become filled, consequently new ones would have to be built, a process which would have to be carried on into eternity.

"Reafforestation is most imperative, for without reafforestation the improvement of rivers can only be partly accomplished, but all these processes going hand in hand, the improvement of the hydraulic conditions of the country will be decisive."

China has been brought to this condition directly by the absence of a national consciousness and of organized methods of government by which the will of the people



Photograph by Frank N. Meyer

THE YELLOW RIVER "CHINA'S SORROW"

Several hundreds of feet of good cotton land have been eaten away during a few weeks. Not in vain is the river called "China's Sorrow" for life and property is never quite safe within its immediate neighborhood. Near Chao Yi, Shensi, China.

so that it reaches the river down below more like torrents of mud than of water. *Now if those mountains were planted with trees* not only would then the water be unable to take away so much soil but it would also reach the river gradually in a regular flow divided over a longer period and not within a few hours in fierce torrents.

"It is impossible, therefore, to lay too much stress upon the enormous importance of reafforestation. The deterioration of the various rivers in China and specially of those in this province, *would never have reached its present stage if deforestation had not taken place*. I say specially the rivers in this province because they all take their rise in the mountains west of the Peking-Hankow line, which for a great part consist of loess, a soil which is easily carried away by the rain.

"To build reservoirs in the hills in order to regulate the



Photograph by Frank N. Meyer

CARAVAN PASSING THROUGH A FORESTED REGION

This is at an elevation of about 9,500 feet above sea level. The muleteers have just set fire to a bit of dry brushwood, against express orders, and a nice forest of blue spruce and white birch is in full flame near Yang Su, Kansu, China.



American Red Cross Official Photograph

THE GROUP OF ADMINISTRATION BUILDINGS

To the right are seen the rounded backs of the rows of huts built for the refugees at a total cost of about ten dollars per hut.

could be enforced to secure public welfare and restrain the greed of individuals, which will always, in the absence of such control, throw responsibility for economic consequences to the wind and grab for the immediate profit.

In the United States the struggle for public welfare and the restraint of ruthless individualism has been waged with more success. Just in time, our great mountainous public lands of the West were established as permanent national forests—and with the adoption of the policy of purchasing lands in the Appalachians and White Mountains, the economic error of permitting these slopes with their protective forest cov-

er, to pass through the process of denudation which has been completed in China, bids fair to be checked in time.

It has never been claimed by foresters or engineers that results of equal destructiveness to those now occurring in China would follow the denudation of forested slopes in this country. But this is true *only* because the combination of conditions here is less dangerous. In the Chinese plain, the watersheds of those rivers comprise 60,000 square miles of very steep slopes, combined with a soil of loess or wind-placed silt—and these conditions are aggravated by the flat gradient of the rivers in the plains below, and by their extremely



Photograph by Frank N. Meyer

NATIVE WOMEN CARRYING BUNDLES OF FIRE WOOD

They start out very early in the morning to cut in the higher mountains and late in the afternoon they are back home again. In this way all chances of forests ever establishing themselves again are frustrated and lumber becomes more and more scarce in western China. Near Siku, Kansu, China.



American Red Cross Official Photograph

A GROUP OF FLOOD VICTIMS IN CAMP

At the "American camp" where accommodations were provided for a thousand families. The south exposure of the huts makes it easy to keep them warm.

dense population and great fertility. But the operation of physical laws of gravity and erosion are not confined to China. To a lesser degree, but to the full extent permitted by the topography, soil and rainfall, and by the stream gradients, these same results not only will occur, but have already occurred along the streams on the Atlantic seaboard and elsewhere. The reckless clearing of steep slopes in the Appalachians and in the wooded areas of Tennessee has caused extensive erosion,

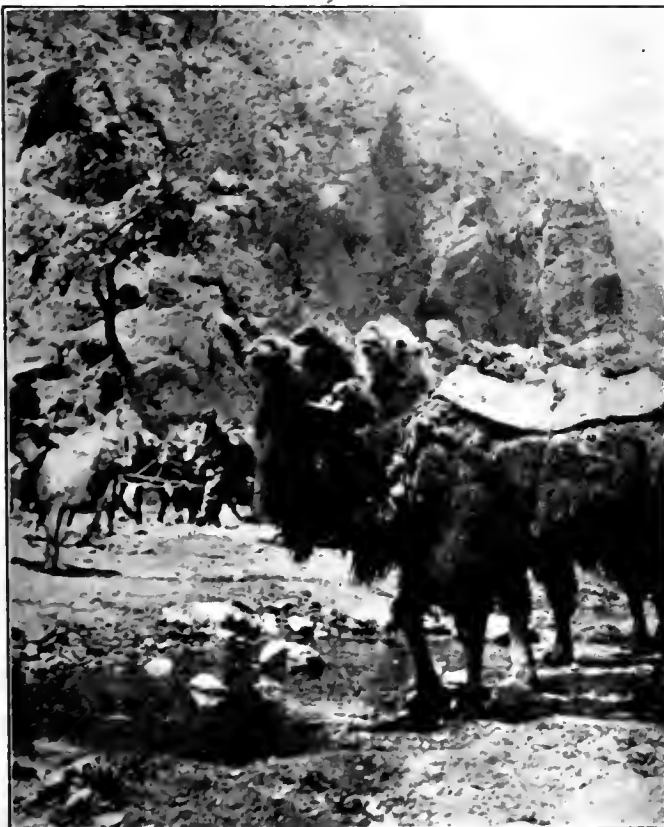
injured many rivers by silting, and destroyed millions in property values, while in the west, overgrazing of mountain slopes has been followed by rapid deterioration of valleys through unregulated movements of water.

Why is a forest cover the only solution of this problem? Because the damage is evidently caused by the combination of velocity, a function of volume of flow, and silt, which is the direct result of velocity and volume, and both these conditions are due to the



American Red Cross Official Photograph HOUSING FLOOD REFUGEES

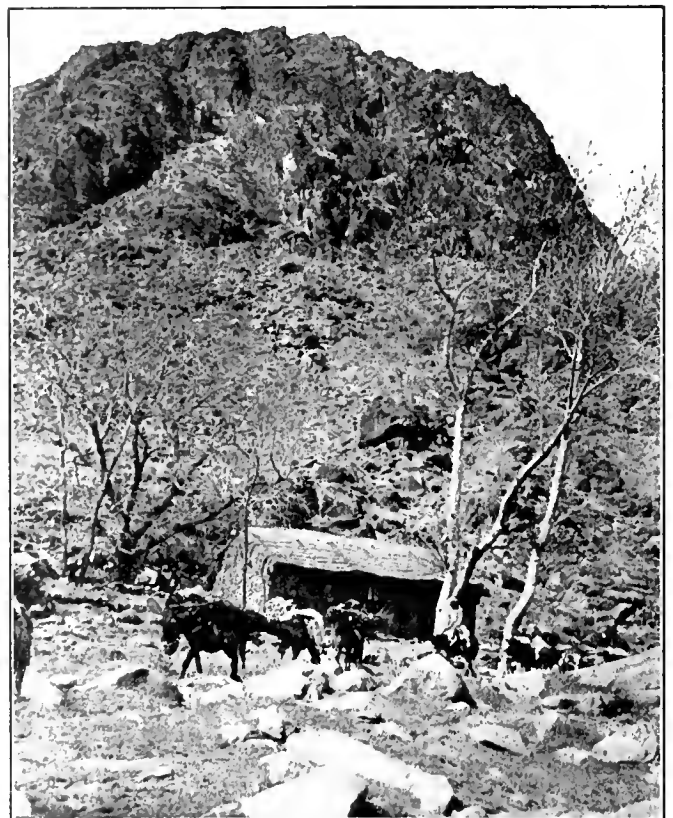
China and America joined hands through the Red Cross to provide and care for the refugees. This shows the huddle of mat huts in which refugees were living after the Tientsin flood before the American Red Cross camp was constructed.



Courtesy of "Asia"

THE CAMEL—TIRELESS SERVANT OF THE MONGOLIAN

Symbolizing to the European all the mysticism and romance of the desert—to the user of camels in China they are merely "indispensable utensils."



Photograph by Frank N. Meyer

ON THE ROAD FROM PEKING TO WU TAI SHAN

A halting place along the road where one can obtain a cup of tea and some coarse oatmeal cakes. A very sterile region and yet scenically very interesting.

character of the surface receiving the rainfall. Dams are inadequate because by the time the water reaches the streams it is too late to control either its velocity or its burden of silt except at enormous expense. But the forest cover controls both factors automatically. From the time the downpouring rain strikes the first or topmost portion of the tree canopy, until the clear water trickles or oozes into the streambeds below, the forest interposes a complete succession of natural barriers to floods and silt. The force of the rain on bare soil dislodges it and hardens the surface. The drainage from such a surface

is rapid and complete, carrying sediment from the very point of impact, and causing the gulying to begin in every direction. Rain falling through a forest canopy drips gently to earth, upon a carpet of waterholding

litter and humus below which the soil is kept porous by protection from rain, by root penetration, and by the humus itself. The surface litter forms tiny dams in every depression and retards the formation and flow of surface water, replacing it with seepage. Not only is the erosion of soil from the surface prevented, but the water is strained and kept clear. When abnormal rainfall swells the streams, their erosive force is kept low by the absence of silt at their sources.

Mr. Lin has contributed information of inestimable significance not only in China but throughout the civilized world, regarding the abso-

lute necessity of maintaining forests on mountain slopes as the one adequate means of protecting fertile plains and rivers, and preventing destructive floods. But not until China has fought and won the battle for national



A STRIKING EXAMPLE OF ARTIFICIAL TERRACING

From this point one may gaze far over this unknown land where hill after hill shows artificial terraces, painfully and patiently built on deforested mountains to prevent further erosion.



WU TAI SHAN, SHANSI PROVINCE, CHINA

Bottom lands buried in waste from deforested mountains.

consciousness and a national government responsive to the needs of the people, can she hope to solve this tremendous internal problem. Just as the physical laws operating to destroy the plains of China as a consequence of forest denudation, are world wide in their application, so the principles of government of the people, by the people and for the people are the only certain methods for securing permanent prosperity and contentment, whether they apply to Caucasians, Mongolians or South Sea Islanders. The Chinese have the natural intelligence to distinguish between despotism on the one hand and rampant individualism on

the other, such as caused France to lose considerable portions of her mountain forests. But it takes more than knowledge to secure results. China's barren mountain slopes must be reclothed with forests in order that

equable stream-flow may be maintained and her people in a measure protected from the terror of flood. *The will to fight* the battle for true democratic government in which order and efficiency is made subservient to the common good—this is the need of China today—and the first fruits of such a victory will be the creation of a national policy for reforesting the mountain slopes of northern China.



Photograph by Frank N. Meyer

LARCH FOREST

The last bit of larch forest left upon a northern mountain slope near the Tchai Ling Sze temple in the Wu Sai Shan region, Shansi, China. White tailed deer and wolves live here in this secluded remnant of the once extensive forest which covered all the now so appallingly barren slopes.



DEFORESTED MOUNTAIN SLOPES

Feeble efforts at farming may be plainly seen in the foreground. Wu Tai Shan, Shansi Province.

THE NEW SPRING SAW

WITH the aid of a new saw that has lately been introduced, it is claimed that a strong boy or woman is able to cut more wood than two experienced lumbermen equipped with a standard crosscut saw. In support



International Film Service

A SAW ANY ONE CAN USE

With this mechanism a boy or growing girl can handle any piece of cordwood that may be brought in to cut up for firewood. It requires but little muscular strength to operate it, and is said to work so smoothly as to attract the attention of the Government experts.

of this claim is the record made during a contest conducted a short time ago.

Two men with a crosscut saw mastered an 11-inch



International Film Service

CONGRESSMAN RAKER OF CALIFORNIA OPERATING THE SPRING SAW

This enables one person to do as much work as two ordinarily accomplish with a standard crosscut blade.

chestnut log in 92 strokes, while one man, with the new machine saw, accomplished the same work in 70 strokes.

The implement consists of two steel arms actuated by a powerful connecting spring. A bracket is attached at the fore end of each of the members, and to these the blades are clamped. To operate, the saw is merely drawn back and forth in the usual manner, all of the necessary pressure being exerted by the spring. The entire contrivance weighs only 12 pounds. It is especially suited for the farmer who does not wish to incur the expense of purchasing a power outfit for cutting fuel wood. In addition to cutting logs, it may be employed for felling trees of medium size.—(*Popular Mechanics*).

ITALIAN GOVERNMENT BUYS TIMBER

AN INTERESTING and highly significant development with respect to the export lumber market has taken place within a short time, says a dispatch from New Orleans. The purchase, by commissioners representing the Italian Government, of 3½ million feet of yellow pine timber (specified of "Southern pine merchantable grades") for delivery at Gulf ports to be moved, via ships supplied by purchaser, to Italy. This sizable order was placed with the Southern Pine Emergency Bureau, which now is distributing the business among the Southern pine mills east and west of the Mississippi. It will be inspected at the mills by Association inspectors and shipped to designated ports to await the cargo-steamers, which are to be furnished by the buyers.

The order is noteworthy and important not only because of its size, but because of its indication that post-war lumber-buying for European countries may be handled largely by government commissions—which in their turn will deal with organized central agencies in preference to making direct purchases from the individual mills. It is not officially settled that this method will be adopted, but in addition to the Italian transaction noted above, there have been intimations very recently that France and England will buy lumber in this country through the "high commissions" which have handled their war-time purchases. The very important question of ocean tonnage, which has bothered students of the export market more than a little, may be disposed of if the business is handled upon the lines indicated, sellers making delivery at American ports and buyers providing cargo space.

SUBSTITUTES FOR HICKORY IN THE MANUFACTURE OF HANDLES

SPECIFICATIONS for handles for intrenching tools were prepared during the war by the Forest Products Laboratory at Madison, Wisconsin, allowing seven substitute species in place of hickory and also certain minor defects, thereby making possible greatly increased production for this class of material and at the same time giving satisfactory handles.

THE USES OF WOOD

WOOD USED IN VEHICLE MANUFACTURE

BY HU MAXWELL

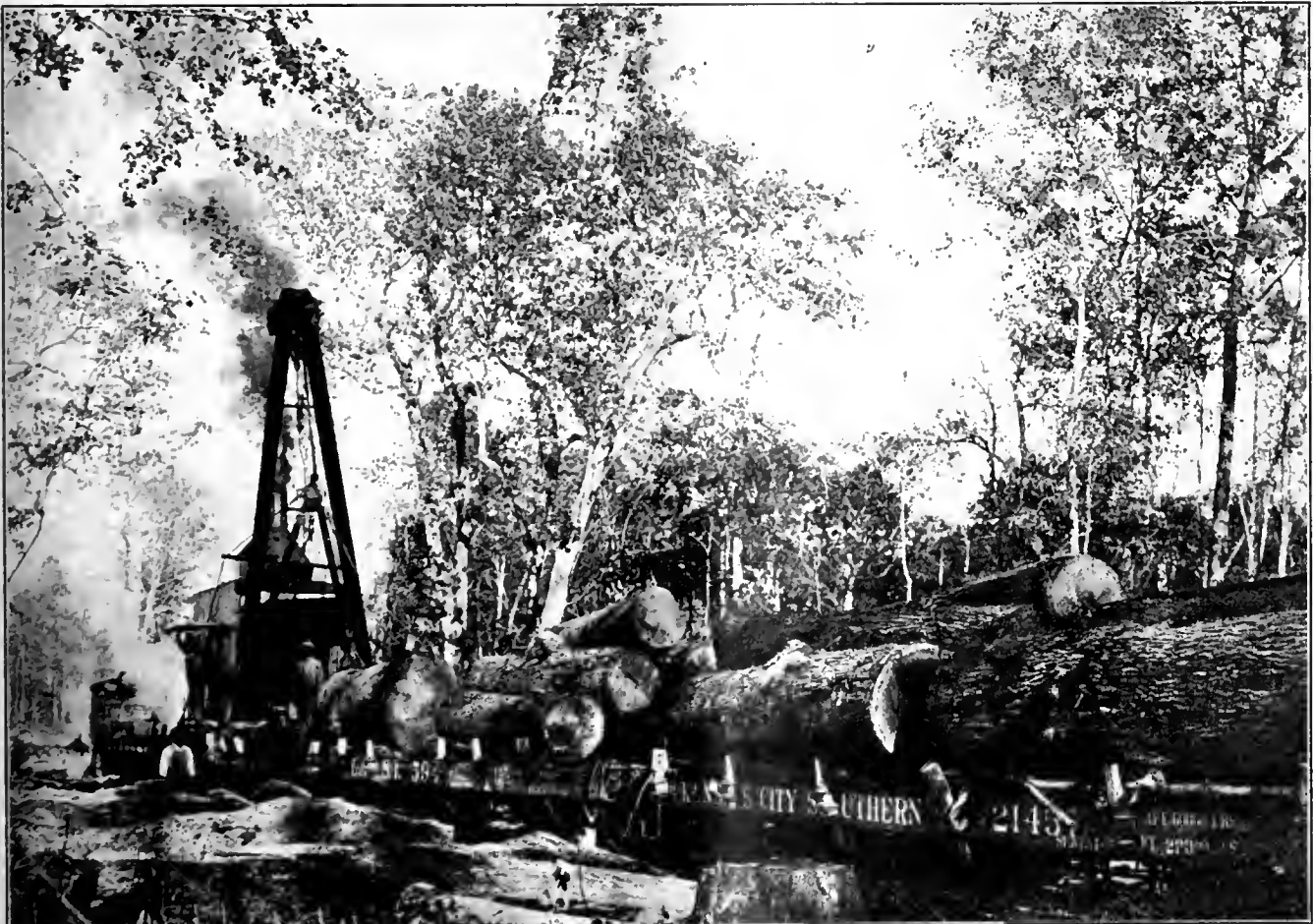
Editor's Note.—This is the tenth story in a series of important and very valuable articles by Mr. Maxwell on wood and its uses. The series will thoroughly cover the various phases of the subject, from the beginnings in the forest through the processes of logging, lumbering, transportation and milling,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

NEARLY every kind of tree that grows to usable size in this country fills a place in vehicle manufacture or repair, either in shop or factory, or on the farms or highways where wagons and sleds are made or mended. So wide is the range of vehicles, as to sizes, kinds, and the places which they are expected to fill, that nearly any billet of wood, large or small, may give service as a sled sole, singletree, pin, crossbar, standard, spreader, neck yoke, axle, or something else that is helpful in making or mending vehicles. Statistics compiled in factories show much but not all of the wood consumed by vehicle makers or repairers. Teamsters on highways, farmers in fields, workmen with teams everywhere, need wood at times to make repairs, and often they go to the nearest forest, if one is convenient, and cut the piece they need. The people who do this put to use, somewhere and at sometime, practically every kind of wood

that grows in America. It is a sort of unwritten law that the driver of a vehicle must be able to make repairs of certain kinds when he happens to be out of reach of a shop. It has always been so; for Homer, writing of the siege of Troy, refers to a similar custom then: "His sounding ax lops green limbs from a sycamore to spoke a chariot wheel." The drivers of sleds, carts, and wagons have been swinging their axes ever since that time in woods and forests to procure wagon material to meet emergencies.

However, a discussion of the vehicle industry must here be confined to a narrower range than that which goes back to Homer's time, or to the activities of the repair man who mends and patches by highways and waysides wherever accidents occur. Up-to-date manufacturing and present day statistics must hold chief place.

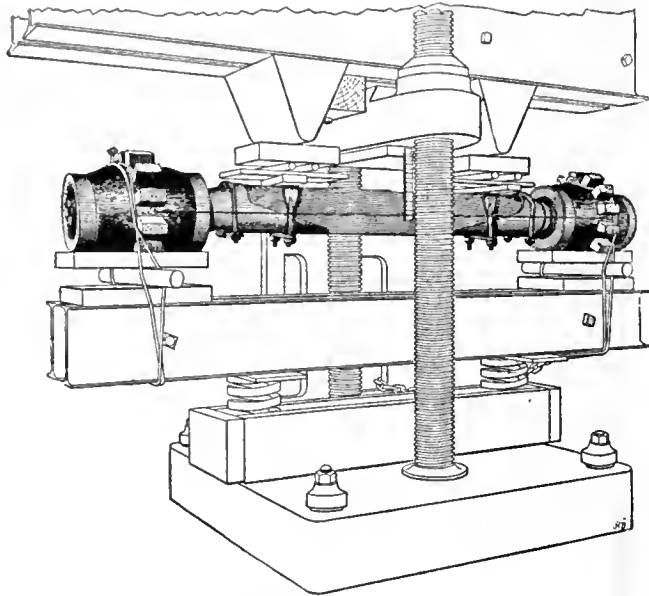
Investigators for the government have gone pretty



RAW MATERIAL FOR AXLES, HUBS AND FELLOES

This scene is in the hardwood region of Arkansas and is strictly up to date. The high grade oak is on its way to the mill for conversion into wagon stock to meet a portion of the extraordinary demand for tens of thousands of heavy wagons for our armies in foreign lands. Only the best wood is acceptable for this use.

fully into the industry which makes wagons, particularly as to the woods used in factories, though little attention has been given to the woods employed and the work done by individuals and in small shops which cannot be classed as factories. A summary of the investigations by the government shows that forty-two kinds of woods are worked into vehicles by factories in the United States, and that the total amount was approximately 740,000,000 feet a year in the period immediately preceding the war. The total is now probably much more. Forty-two woods are listed by name, but the actual number of species is much larger; because in most cases the listing is by genera, and different species are not mentioned by



HOW WAGON AXLES ARE TESTED

The above picture represents the type of machine employed by wagon manufacturers and by the Government in testing axles to determine their strength. Pressure by means of the powerful screws is applied until the axle is forced to give way; but the applied pressure is measured at the various stages and the information thus obtained is of future value.

name. For instance, all pines are classed as one, though there are thirty odd pines; all oaks as one, and there are more than fifty oaks; all hickories as one, though there are a dozen, all ash as if but one existed, but there are several, and so on down the list. Instead of only forty-two vehicle woods, as the list shows on its face, the number doubtless exceeds 150 if each species is duly credited with its share.

But accepting the figures as they are given, the vehicle makers use seven foreign woods, seven domestic softwoods, and twenty-eight domestic hardwoods. All the foreign species enumerated are hardwoods; so it turns out that of the forty-two woods, thirty-five are hardwoods. Measured in feet, the hardwoods total 702,264,003, the softwoods 36,878,444; expressed in percentages, the hardwoods constitute 95 per cent, the softwoods five per cent. The use of foreign woods in the vehicle industry are here shown:

| | | | |
|------------------------|---------|--------------------|---------|
| Mahogany..... | 516,000 | Padouk..... | 1,000 |
| Eucalyptus..... | 40,000 | Doncello..... | 330 |
| Circassian walnut..... | 16,820 | Spanish cedar..... | 250 |
| Rosewood..... | 1,000 | | |
| | | Total..... | 575,370 |

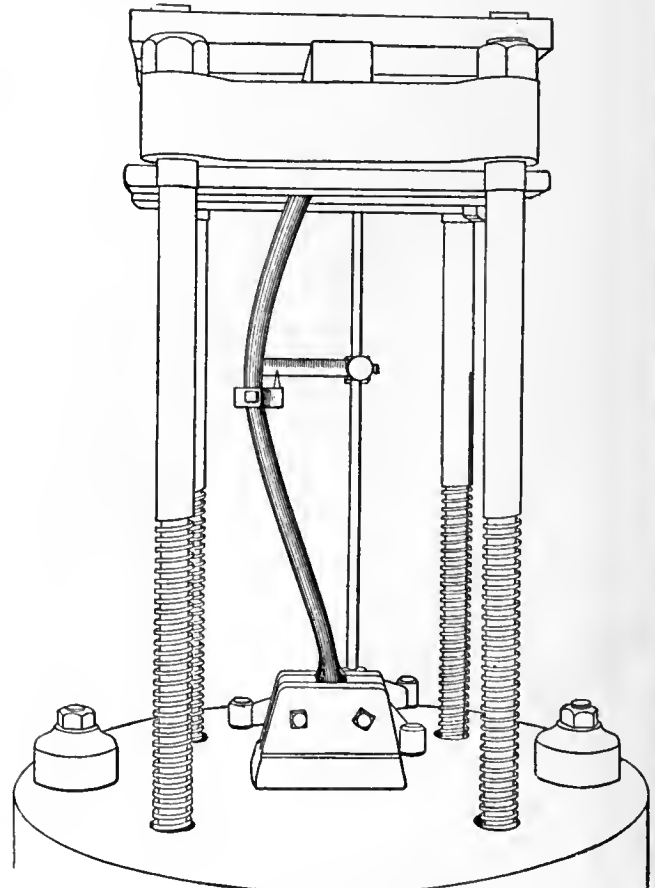
The names and amounts of the seven softwoods which contribute to the vehicle supply follow:

| | | | |
|--------------|------------|--------------|------------|
| | FEET | | FEET |
| Pine..... | 33,077,055 | Hemlock..... | 448,678 |
| Cypress..... | 1,320,951 | Redwood..... | 259,000 |
| Fir..... | 934,610 | Cedar..... | 2,500 |
| Spruce..... | 835,650 | | |
| | | Total..... | 36,878,444 |

The list below names the hardwoods used annually in the American vehicle industry:

| | | | |
|--------------------|-------------|-----------------|-------------|
| | FEET | | FEET |
| Hickory..... | 239,483,910 | Hornbeam..... | 126,000 |
| Oak..... | 212,918,361 | Locust..... | 110,350 |
| Yellow poplar..... | 48,665,960 | Hackberry..... | 100,000 |
| Ash..... | 43,974,668 | Buckeye..... | 63,419 |
| Maple..... | 35,863,267 | Sycamore..... | 62,600 |
| Cottonwood..... | 33,278,658 | Cherry..... | 39,650 |
| Elm..... | 31,296,922 | Butternut..... | 11,500 |
| Red gum..... | 26,650,314 | Magnolia..... | 9,500 |
| Birch..... | 14,267,125 | Blue beech..... | 5,000 |
| Basswood..... | 6,418,308 | Cucumber..... | 3,800 |
| Beech..... | 5,497,308 | Applewood..... | 1,000 |
| Tupelo..... | 1,067,600 | Catalpa..... | 500 |
| Chestnut..... | 972,809 | China tree..... | 500 |
| Osage orange..... | 439,026 | | |
| Black walnut..... | 390,450 | Total..... | 701,687,940 |

Though numerous woods are used in a small way in vehicle making, comparatively few are employed in large amounts. The two most important are oak and hickory. All others combined do not equal the amounts of these two. They contribute sixty per cent of the whole supply. No other industry is so dependent upon one or two woods, except shuttles and lead pencils, in each of which



METHOD OF TESTING BUGGY SPOKES

The strain on a buggy spoke comes from endwise pressure, and if the spoke is overloaded it bulges at the middle. The machine represented in the above picture delivers and measures pressure of that kind, and the behavior of the spoke is shown. Tough woods bend, but brush woods break under that strain.

a single wood exceeds all others combined. For vehicles oak and hickory are fairly evenly matched in quantity, but hickory is the leader. Its place is in light vehicles like carriages, buggies, carts, and racing sulkies where elasticity or resiliency is highly essential. Oak goes more into heavy wagons where elasticity is not of first consideration but strength is accorded the leading place. The

that each will be equal to the duty assigned it. Averages have been worked out by elaborate tests; and dimension stock is cut in sizes which will assure sufficient strength. Most large vehicle factories maintain testing apparatus



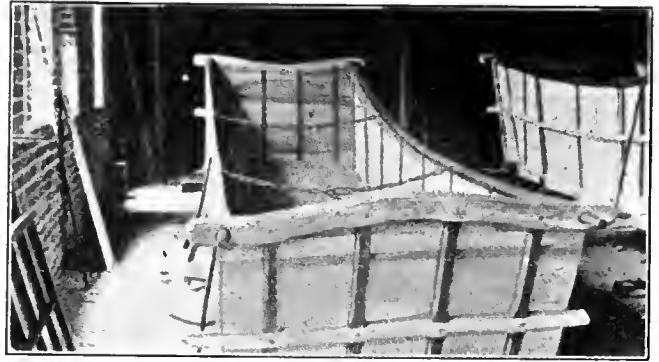
WATER WAGON WITH WOODEN TANK

This vehicle, serviceable for the purpose intended, represents a rather unusual use for wood in wagon making. The work must be well put together or the joints will leak as the result of jolting over rough roads. The tank here shown was manufactured at York, Pennsylvania, by the A. B. Farquhar Company. The tank's capacity is ten barrels.

two woods, oak and hickory, are dissimilar in many of their qualities.

The average strength of hickory is about thirty-three per cent greater than that of oak, when both are well seasoned, but the strongest oaks are not below medium hickory in strength. Hickory is the tougher wood, and in point of elasticity, or the ability to spring back when bent, it averages about fifteen per cent superior to oak.

Every kind of wood varies greatly in strength and elasticity when one sample is compared with another, and hickory and oak are no exceptions. For that reason it is necessary to select these woods carefully for vehicles, to make sure



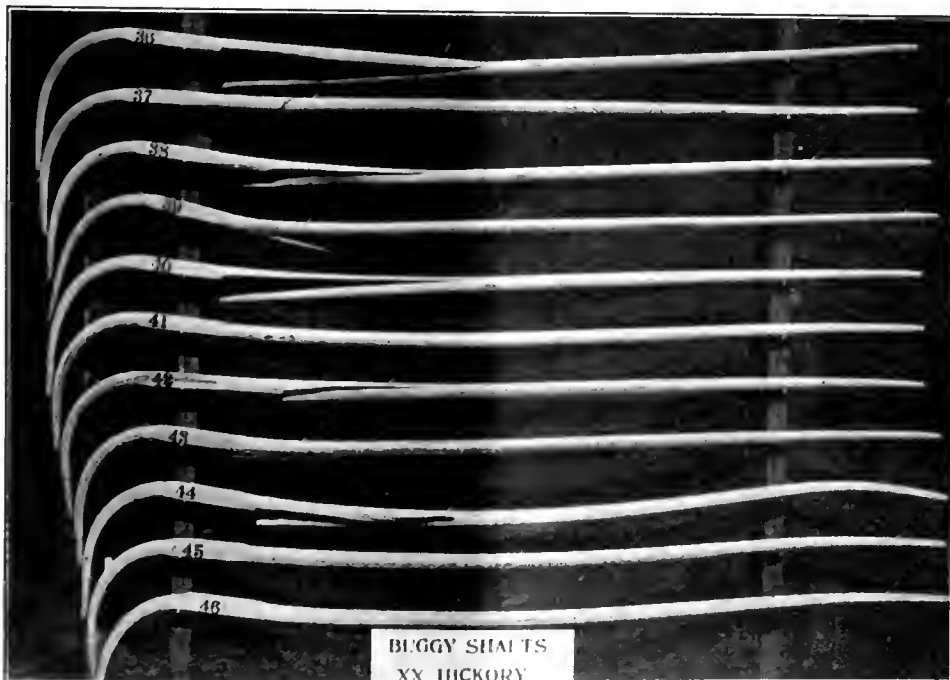
A RELIC OF OLDEN DAYS

The body of an overland freight wagon that crossed the plains of the far west before the first railroad was built west of the Mississippi River. The exterior wooden braces and the stay chains across the bed give additional strength and increase efficiency on rugged roads. Such a bed held enough merchandise for a four or six horse load.

of their own; and the government laboratory at Madison, Wisconsin, has gone thoroughly into the matter of vehicle woods and has compiled information available to manufacturers who care to use it.

Hickory's best use is as poles, shafts, reaches, rims, and spokes for light vehicles; while oak serves best as spokes, felloes, hounds, tongues, bolsters, axles, hubs, and other parts of the running gear of large wagons. Other strong woods employed in considerable amounts by wagon makers are ash, maple, elm, birch, beech, Osage orange, and locust. Some of these are selected for particular parts. Of ash they make spokes, standards, and

axles, and occasionally beds for ore wagons and frames for automobiles. Maple is very strong and it is often made into heavy axles. Elm is tough and is one of the best woods for long spokes in extra large log wagons. Birch and beech fill places similar to those filled by maple and ash. Osage orange, or *bois d'arc*, has a special place. It has often been selected in preference to



WHAT MIGHT HAPPEN IN A RUNAWAY

Manufacturers of huggies put the shafts to the severest tests to determine strength and toughness, and to discover defects. Only those which come through the ordeal unmarred are considered suitable for high-class vehicles. The accompanying illustration shows some of the defects which may be discovered by tests. The unfits are, of course, rejected.

all others for felloes of wagon wheels which are expected to see service in the hot, dry regions of the southwestern part of the United States, in Kansas, Oklahoma, Texas, and westward. It is extremely strong and durable, but the chief characteristic recommending it for felloes is its



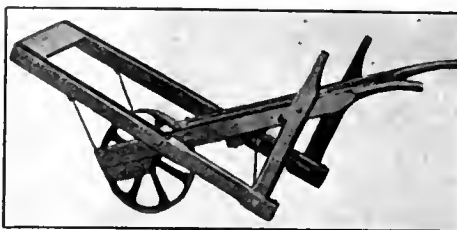
RESULT OF OVERLOADING A WHEEL

The strongest, toughest wood in the world has its limitations. Overload it and it will crush. The stubs of broken and twisted spokes in this picture betray the enormous strain under which they gave way. They are of hickory. No other wood, under the same circumstances, would have come through with as little wreckage.

Under similar conditions, tires can scarcely be kept on wheels made of other woods. In running through deep sand, the paint is quickly worn from the felloes. Most woods, when not covered with paint, soon absorb water when exposed to dampness; but an unpainted Osage orange felloe is polished by sand and becomes smooth like horn, and moisture has little effect on it. Nevertheless, it has its drawbacks, one of which is its lack of elasticity. Jolting over rocks is apt to break the felloe. It does best in hot, sandy roads. An agreement recently entered into among wagon manufacturers has for its purpose the elimination of this wood as a wagon material, because of the increasing difficulty of procuring it. Though it has been widely planted as shade and hedge growth, the commercial supply has always come, for the most part, from its natural range in Texas and Oklahoma, where its original home did not much exceed an area of ten thousand square miles. That is a small range for a com-

mercial tree, and the supply has become very limited.

Locust is a hub wood for light vehicles. Its extraordinary strength and durability, in addition to its hardness, qualify it for use as hubs. It holds spokes firmly, resists strains and twists which would break most woods, and decay has little effect on it in many years. Elm is also a hub wood, but its place is in heavy wheels instead of light, and it is a competitor of oak in the hub factory.



A SMALL BUT USEFUL VEHICLE

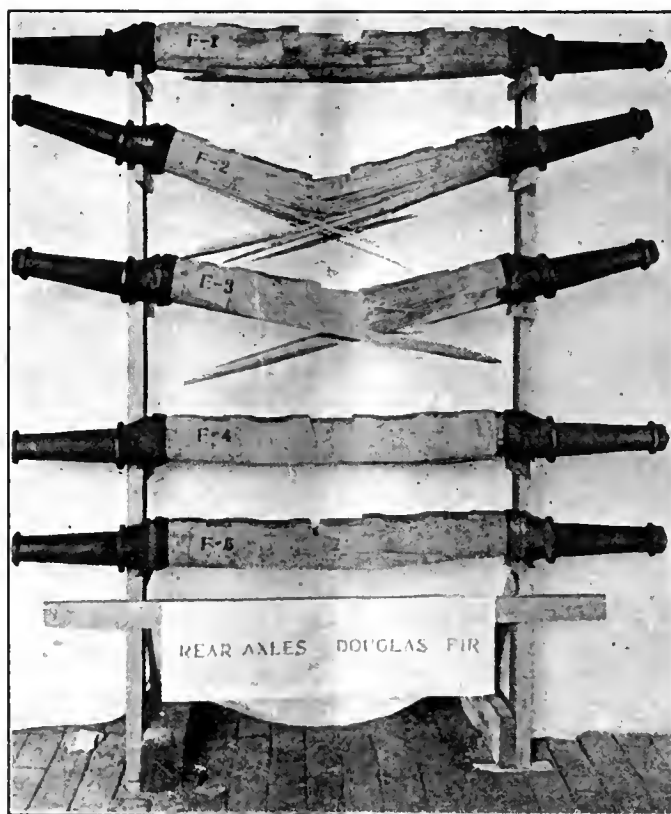
All of the important wheeled appliances for transportation are not drawn by horses, oxen, or driven by motors. The wheelbarrow in some form is with us always, and there are different forms of this lowly implement. Some have one wheel, and some two, but they all are propelled by pushing. The pattern shown in the picture is for use on factory floors.

Hornbeam is very strong and hard, but the total demand for it is not large, for the reason, among others, that it is not abundant and is procured with difficulty, but it fills a special place in the vehicle industry, being preferred as tongues for very large and strong logging wagons and carts.

The beds or bodies of wagons call for special woods, and the choice falls on yellow poplar, basswood, tupelo, cottonwood, and red gum. The wood for bodies must be light, tough, fairly strong, not inclined to split, and it

must possess excellent finishing qualities. The finely-smoothed surface must paint well, for the show part of a wagon or carriage is the body. The lumber for the bodies or beds of farm and road wagons is known as box boards in the market, and though various dimensions may be had, boards from thirteen to seventeen inches wide, clear and sound, constitute the highest class. The foregoing list of vehicle woods contains no mention of willow, yet some willow box boards are used with satisfactory results. They are probably classed in statistics as cottonwood, or "brown cottonwood."

Fine carriages and automobiles display high grade wood finish, the automobile more of it than the carriage. The government statistics covering vehicle woods (and there are no



BROKEN IN THE INTEREST OF SCIENCE

These Douglas Fir axles did not reach their present condition by accident or ordinary usage. The Government's testing laboratory at Madison, Wisconsin, broke them by powerful machinery to determine what loads they were capable of carrying. Compared with other woods the showing was satisfactory.

other statistics worth the name) do not distinguish between horse-drawn and motor-driven vehicles; consequently, it is not practicable to quote figures giving the woods used in each class; but it is a matter of common knowledge and observation that the automobile now demands most of the fine woods, both foreign and domestic, employed in the vehicle industry. The leading native woods appearing in such finish are birch, black walnut, sycamore, cherry, and butternut; and all the foreign woods on the list belong in the finish class.

Whether vehicles are drawn by animals or driven by motors, they belong in two general classes, those for pleasure and those for business.

The line of separation is not always clearly drawn, since considerable pleasure may be derived from the business wagon, and the pleasure vehicle may contribute to business. Each class is subdivided to an almost infinite degree. A vehicle need not go on wheels, for the sled or sleigh is as much in evidence as the wagon or carriage, but within certain regions. No marked difference in the material that goes to make a wagon or to make a sled can be pointed out.

Strong materials are needed in each, and woods suitable to make the bodies of one are also the kinds wanted for the other. The cutter's artistically-painted bed calls for as high a grade of yellow poplar, gum, maple, or basswood as is demanded for the panels and body of the carriage; and the bob-sled, block-sled, stoneboat, and yankee jumper are constructed of materials similar to those consumed in the manufacture of the grocery wagon and the ox cart.

The hickory racing sulky is said to have made the American race horse famous. The wood is so strong, tough, and resilient that a sulky of extreme lightness, and of remarkable endurance has been the result, and it is with-

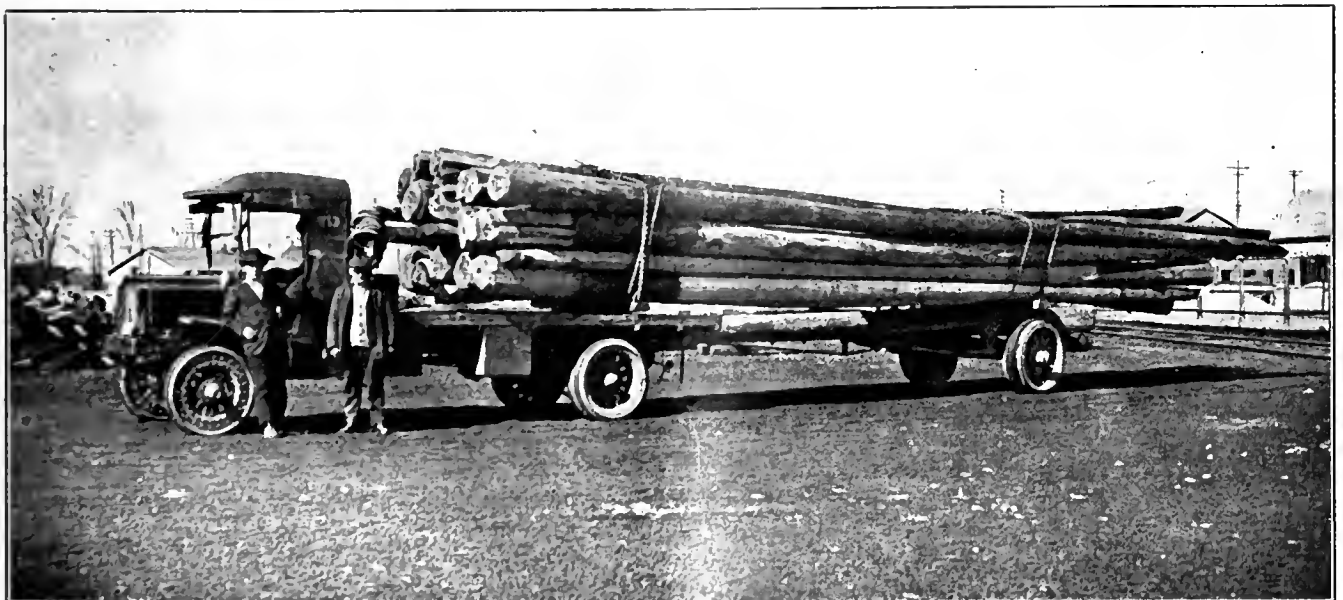
out an equal or a rival. This made possible the lowering of racetrack records, and in many instances the sulky wins races for which the racehorse receives the credit. However, the fact has been recognized that the hickory tree has had its part in much racing history which has redounded to the credit of American racetrack sportsmanship.

The trade wagon's place in the daily business affairs



THE FAMOUS CONESTOGA WAGON

This is not a picture of a replica of the famous Conestoga wagon, but of the genuine article, though one of the last survivors of the romantic days of old, when wagon transportation was the only kind across states. This photograph was taken at Altoona, Pennsylvania, and was made available for this illustration by the courtesy of the Pennsylvania Railroad.



DEFEATING RAILROAD EMBARGOES

This heavy truckload of poles gives more than a hint of the modus operandi of breaking the railroad embargoes which have plagued domestic commerce so much during the past two or three years. If the haul is not too long, the motor truck takes the load and speedily delivers it at its destination. This is being done all over the country with excellent results. The cut shows the Frehauf Semi-Trailer tractor.

of the country is a conspicuous one. A special make of wagon has been provided for the baker, butcher, grocer, huckster, ice cream vender, fishmonger, flower seller, and a list of others almost interminable. Most of these are specialized in bodies rather than in gear. Each has its boxes, shelving, and compartments built to meet the user's peculiar needs. Much pine, fir, cedar, spruce, hemlock, cypress, and redwood are worked into such tops and bodies. Accompanying these softwoods, and used in the same way, are cottonwood, basswood, gum, poplar, elm, sycamore, hackberry, beech, buckeye, and other hardwoods. Much ash and some hickory are em-

now as they supplied it before railroads captured the long-distance travel.

No one man invented the vehicle, but many a man has made improvements on models already existing. Patents by thousands have been placed on record, nearly three thousand patents for springs alone. There are patents on hubs, axles, tops, and on nearly every other piece and parcel of a vehicle. These indicate growth and development, though the first vehicle made by man was so long ago that no record of it exists. Some of the ancients used sleds when they could not make wheels strong enough to carry the loads, and it was dry sledding in the deserts of



POSSIBILITIES OF THE MOTOR TRUCK

Remarkable strength and excellent speed characterize motor trucks like that in the above illustration (Duplex, Lansing, Michigan). The wooden wheels are feats of engineering, no less than the powerful motor and the rigid frame. The maximum load that may be carried is measured by bulk rather than by pounds.

ployed for bows and other parts of the tops of such business wagons and over all the tent or cover is stretched as a protection against snow and rain.

The horse-drawn stage coach, famous in the days of Charles Dickens' American tour, and later in the western experiences of Mark Twain, has nearly gone out of use; but not so with the city omnibus and the taxi. These vehicles are in the thick of business and they are largely of wood. They are passenger carriers, as the old stage-coach and thoroughbrace were, and forests supply the material

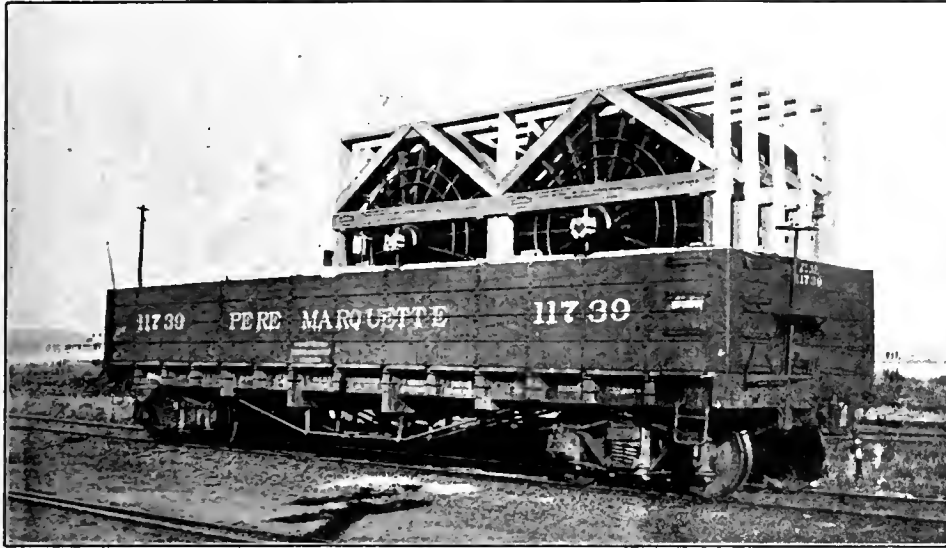
Africa and in the land of the Hittites. Yet those people knew about sleds and some of the loads hauled on them surpassed the records of the largest sled loads of logs in Michigan and Wisconsin. The ancient people had wheels also, and they had many kinds and sizes. Some were nothing more than wooden rollers like modern house movers use, and they worked in the same way. They had wheels on axles, some of them heavy for oxen, others light for horses. They made built-up wheels such as we make now. A rock carving in Syria shows a chariot

with wheels which would almost pass for automobile wheels of today, except the tires. The chariot dates from before the time of Sanballat, or 1000 years before the Christian era. The light wheels on some of the chariots

past and better than vehicles are now in the countries across the sea. That is in part due to skill in manufacturing and due in part to the excellent woods supplied by our forests. No other country ever had anything to

compare with our hickory and Osage orange in their peculiar qualities; but we have had other woods and plenty of them, and the wagon and carriage makers never lacked material. According to Burnaby, there were 9,000 wagons in Pennsylvania in 1759, and according to Filson who spoke from personal knowledge, the wagons were worth fifty dollars each, when sold at Philadelphia. The nine thousand wagons represented an investment of \$450,000 in wagons in Pennsylvania alone at that early date. The figures stand for what was left after Pennsylvania in the year 1755 had furnished wagons worth \$100,000 for the ill-fated Fort Duquesne expedition under Braddock, from which

scarcely a wagon returned. The Carnegie Museum in Pittsburgh has the tire from one of those wagons, found in recent years near the battlefield where Braddock's army was defeated by the Indians. The old tire sug-

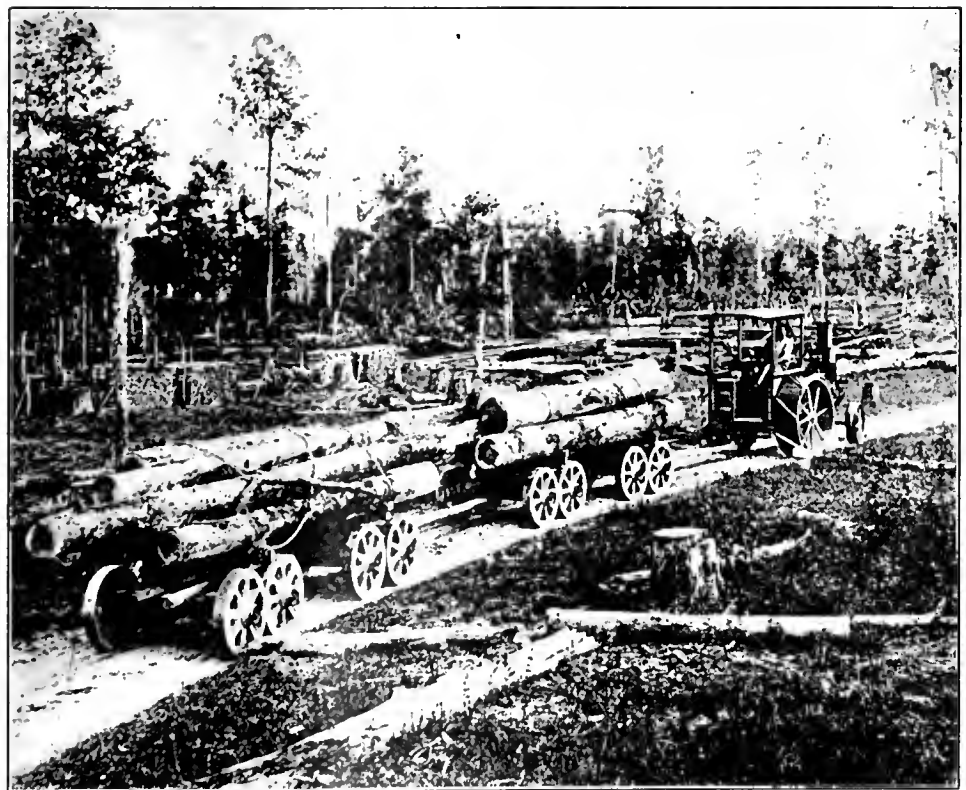


ON THE ROAD TO FRANCE

This shipment of Overpack's Michigan logging wheels was bound for France to assist the American forces in getting out war material from French forests. The wheels are ten feet in diameter and are well known to logging contractors not only in America but in distant countries. They are manufactured at Manistee, Michigan. The spokes are of cork elm and are said to be the longest in the world for wagons.

of the ancients, of which some knowledge exists at the present time, were made of birch, sycamore, locust, fig, and other woods which now would not be regarded as wholly satisfactory for wheels. Some of them had little or no metal, and were not very different from the light wooden Red River carts of Manitoba and Saskatchewan, or like the heavier, clumsier all-wood carts used by the New Mexicans a hundred years ago. It is not necessary to go farther into the history of vehicles made in ancient times. The point is that there has been a long series of developments in the plans and the making of vehicles, and we are simply using what was in part used ages ago, and are adding to make them better. It is a notable fact that the American Indians knew nothing of wheel conveyances. It is not known that they ever made or used a wheel of any kind, unless their discoidal stones be regarded as such, and they were only playthings. But they had a rude sled consisting of two poles on which they placed the article to be moved, and thus dragged it along the ground.

American vehicles are now better than they ever were in the



A TRACTOR DOING STRENUOUS WORK

It begins to look as if tap line railroads may soon be dispensed with in logging operations, if tractors continue to expand their spheres of usefulness. The accompanying illustration represents an Avery tractor (Peoria, Illinois), hauling logs on Powell Brother's operation near Elton, Iowa. Ox and horse teams are back numbers there.

gests a story in wagon improvement since then. It was made in sections, each section being fastened to the felloes with iron bolts, the heads of the bolts protruding through the tire, like cogs on a wheel, but spaced farther apart. In wagons of that kind the felloes were made thick and strong and they supported the tire; but the modern tire supports the felloe. The change in construction shows a great improvement in wagon wheel building in one hundred and fifty years.

The most famous wagon ever made in the United States or in the world was the Conestoga. It had its name from the name of the town in Pennsylvania where the earliest were manufactured about the time of the Revolution. The name appears to have been applied later to wagons of the same type made elsewhere, notably those manufactured at Newton, Virginia. During the westward movement, when families trekked to new homes beyond the Mississippi, wagons of that kind carried them, and were known as "prairie schooners," and still further west they were sometimes designated as "ships of the desert," though that name was a borrowed term rightly belonging to the camel in eastern lands.

The Conestoga wagon was a really important agent in American history and romance. Its front wheels were small, rear wheels high; the hubs were enormous; the body was high in front and behind and projected far over the running gear fore and aft; a white cover was stretched over the bows, providing a waterproof roof, lynch pins held the wheels on; brakes, commonly then called "rubbers," checked the wagon's speed descending steep hills; and the inevitable tar bucket swung from the rear axle. The tar was the lubricant for the "thimble-skins"—the metal-covered wooden spindles on which the wheels turned. It was pine tar and it had an odor which has been described as "enduring from everlasting unto everlasting." The highways along which those old Conestogas traveled smelled perpetually of the pine tar dripping from the hubs of passing vehicles.

The Conestogas were the freight carriers overland before the days of railroads, and convoys of them made ambitious journeys. A famous route led from Philadelphia and Baltimore to Nashville, Tennessee; but that was not the longest route. One led from the Mississippi River through New Mexico to Chihuahua in Mexico. Over that long route the wagons carried merchandise, and those who drove the wagon trains across the Indian country always went prepared to fight the redskins. It was the same with the long emigrant trains which journeyed to the Pacific Coast from the Mississippi or the Missouri Rivers. Writings relating to the frontiers of that time are filled with references to the Conestoga wagons. Among those who recorded the perils and romances of the overland pilgrimages were John James Audubon; Francis Parkman; James, Prince of Weid, and Zebulon Pike, names famous in frontier history and travel.

Of the horse-drawn vehicles those used for pleasure were the first to yield to the automobile. Between 1906 and 1916 the manufacture of horse vehicles, other

than farm wagons, declined sixty per cent. The automobile's inroad upon farm wagons has not been so great, but it has been considerable. The total number of vehicles of all kinds has probably not decreased, and it cannot be positively stated that the quantity of wood required in their manufacture has declined. Automobiles require considerable amounts of wood in their construction, but they also use much metal. Some of the best automobiles are built with wooden frames, and practically all motor vehicles are trimmed with high class woods.

FREE TREES FOR PLANTING IN PENNSYLVANIA

A LARGE supply of extra fine forest tree seedlings will be available for free distribution this spring, has been stated by Commissioner of Forestry, Robert S. Conklin. This is a real opportunity. Anyone who wants to plant forest trees this spring may have them for the asking. There are no strings to the offer, the only condition being that applicants plant not fewer than 500 trees, pay for the packing and transportation, and actually set out the trees in Pennsylvania for reforestation. The trees may not be sold and no orders for ornamental stock will be filled.

The stock available for free distribution is almost all three years old and includes white pine, red pine, Norway spruce, European larch, Arbor Vitae, and a limited quantity of Japanese larch and white ash.

Last year over two million trees were planted by private owners of forest land in Pennsylvania. Applications for almost one million trees have already been received for the spring planting of 1919. Hence orders should be sent early for the supply of certain trees will surely be exhausted, and the number available in subsequent years will be considerably reduced on account of the difficulties experienced during the past few years in purchasing forest tree seed. Application for these trees should be made to the Commissioner of Forestry, Harrisburgh, Pennsylvania.

BEWARE THE ASH-WOOD BORER!

WOOD boring insects were responsible for the loss to a Mississippi lumber company of more than a million feet of ash logs, according to reports of investigators of the Bureau of Entomology recently. It was during the manufacturing operations to meet the war time demand for ash oars, ash handles and other supplies.

The company had failed to provide for prompt utilization of the logs after the trees were cut, and the destructive ash-wood borers got busy in regiments and divisions.

The bureau lately has been devoting its energies to advising lumbermen and others interested in successful methods of combating the pest, in the hope of preventing a spread to other sections of the country.

WALKS IN THE WOODS

(I) THE NEPPERHAN VALLEY IN WINTER TIME

BY J. OTIS SWIFT, AUTHOR OF "WOODLAND MAGIC"

(WITH PHOTOGRAPHS BY THE AUTHOR)

IT IS bright and sunny outside the house here in The Manor. The inch of snow on the ground is melting wherever the sun strikes it. The day grows warmer. The blue of the distant Ramapoo Mountains, clear and bright as turquoise this morning, is growing dim now as the haze rises from the shining Hudson. The grim Palisades turn from purple to gray and brown across the river. It is a winter day full of grandeur. Mile upon mile of rolling country over beyond Tappan and The Reaping Hook suggest big thoughts and sweeping impulses as I gaze from this ridge of hills. But all the morning I have had a more intimate desire in my heart. I have wished to see and study a more humble part of the universe about me. You will laugh, I am sure, but I have been wishing to see, to make sure down to the smallest detail, just what this bitter winter has done to the little frog pond over the hill at the foot of the old woodroad in the Nepperhan Valley.

Kings have their courts, and emperors their botanical gardens, but not one of them is more wonderful than this little three-acre button-bush circled, flag-waded, lily-dotted home of painted turtles and pollywogs. The greatest landscape gardener in the world, who works day and night, summer and winter, without salary and for pure love, laid out its mystic mazes and hidden grottoes. You know the place in summer! A very tangle of wild frost grapes, wild beans, sumach, Benjamin-bush and sassafras, surrounding a half dried up shallow of green cow-lily padded water, reeds, grasses and marsh marigold and mallow!

To get there we go over through the grounds of the New York Juvenile Asylum and down an old twisting woodroad. Once this woodroad was a colonial lane from Hastings to Tuckahoe, and Washington's troopers pass-

ed this way. Before that, legend says, it was the old Algonquin trail where the Iroquois came down from Central New York in the autumn to eat clams and oysters along the Sound in winter. It comes down from Tappan over the Palisades into the Lawrence Estate intersecting the Palisades Interstate Park on the west side of the Hudson. The Dutch settlers made a roadway of it on this side. Christmas ferns, rock ferns, jack-in-the-pulpits, bloodroot, Dutchmen's-breeches, windflowers, fairy-cup moss, sarsaparilla, and a hundred other beautiful little denizens of the wildwood grow among the lichen-covered stones down this old forest wood path.



THE OLD WOOD ROAD DOWN INTO NEPPERHAN VALLEY AND THE FROG POND

Overhead are white and red oaks; dead chestnut trees, gaunt and skeleton-like in their barkless nudity; great old tulips that are glorious in the spring. Today there is a hush in the wood. Chickadees chirp vaguely. White breasted nuthatches run head downward over the bark of the black birches, saying softly, "Crank! Crank!" But it is not the hush

of death. Only the chestnuts are dead—and even they are not dead, for they struggle up in shoots every spring, about the roots. Will the parasite disappear before they are quite gone? Far and wide through the forest we are almost conscious of the breathing of the trees in their winter sleep. It is the rest time, preparatory to spring's reincarnations.

The tall, dry stalks of the lobelias rustle disconsolately, their old clothes in the wind—like ghosts shaking their shrouds about them. But, oh my friend, kneel down here in the dead leaves by this clump of black haw and I'll show you the ever-new miracle of reincarnation. Carefully we dig away the snowy leaves and decayed vegetable mould about the roots of the lobelia, and discover a nursery with two or three babies sleeping healthily. Each

baby is an off-shoot from the mother stalk of the lobelia, waiting patiently for next spring's hush-a-bye baby songs through the undergrowth. The under world of the loam, just below the dried leaf coverlet, is verily whispering with life and energy. The ground is not frozen here in this warm corner. Our fingers uncover elongated cucumber-roots, jack-in-the-pulpit corms, tiny, globular, bulb-like roots of many of the early spring flowers; the hard nut-like tuber of the spring-beauty, the fleshy roots of the dog-tooth violet—all very much alive and waiting with



THERE ARE DENSE MASSES OF BUTTON BUSH ON THE FAR SHORE

almost throbbing interest for the first warm rays of the sun-god to call them in the spring.

No, there is no death here! Only eternal, everlasting life, incarnated again and again. Mother Nature kneads over and over this black earth to give form and fibre to the souls of her plant children—for if they have not souls what is the thing that is not matter, in the trillium, the painted emblem of the Trinity? They are reincarnated over and over, these wanderers of the wild places. This tangled, sprawling root of wild ginger, *Asarum canadense*, was black loam a few years ago. It will be black loam a few years hence. But in its crawling, snake-like roots is a spark of life as old, almost, as anything in the world. It has come down the centuries, undying, this particular thread, but constantly reincarnated. It is as old as you or I. But let us get on to the frogpond! We clamber down over gnarled root and mossy logs.

There is ice on the pond. The thin sheet of snow is tracked with the feet of rabbits, squirrels, meadow mice, mole shrews, and crows going to the air holes—and something, perhaps only the wind, has been scattering the seeds of the marsh mallow over the white coverlet. What a glorious sight these marsh mallows were last August, staining great patches of the swamp with pale rose color!

They stand dry and sere on little islands knee deep in ice, now. The wind rattles their hard little seeds like pills in a box. Beyond the marsh-mallow are yards and yards of wild rose bushes, their red tips glowing brightly. Our grandmothers used to gather some varieties of them to make into jellies. Along the far shore is a jungle of button-bush, covered now by dry, round balls, but last summer making the bank look a bevy of brides in their veils, the white flowers densely gathered in rounded peduncled heads.

We go gingerly out on the ice, and on a far little island, hidden behind clumps of elderberry where the cedar waxwings, bluebirds and starlings feasted last autumn, come upon a large high-bush blueberry. It should have borne several quarts last year, but no one could have picked them, and only the birds could have known of the banquet—though dozens of boys passed within a few rods on their way to school. Along the shore where in summer painted turtles sun on rotting logs, the dry stalks of arrowleaf, cat-o-nine tails, calamus root, water arum, cardinal flower and countless other free citizens of the bog greet us as we pass. The farmers have been trying



A QUIET SPOT UNDER GIANT OLD OAKS AND TULIPS

to exterminate them for hundreds of years, but these persistent democrats flourish on from year to year, fulfilling their duty of making the waste places beautiful.

There is a sense of mystery revealed in walking about a frozen bog in winter. The catbird's nest that defied you last July while its owner fluttered before you through the watery jungle, mimicking every bird in the swamp and many out of it, is plainly revealed now, a little handful of sticks laid carelessly across the crotched twigs of the cornel bush. It is half full of snow, but there is still the air of a home about it. Close down by the door of old Musquash's reedy house—the muskrats built high

this year in anticipation of floods next spring—an owl has been tearing away the dead grass of a meadow mouse's nest, looking for his supper. Did he get him, we wonder. There are tunnels under the snow, new made. So probably *Bubo* was disappointed.

There is color enough about the swamp, even in winter time, to delight the eye of an artist. The thin willowy shoots of the cornel, the red-osier dogwood, are turning blood red; the willows are brown and yellow; the sassafras bark is paint-green, the color country folks used to paint their house blinds; the benzoin, or spice bushes, are black with yellow buds ready to break open before the leaves come in the spring; the climbing bitter-sweet with its scarlet seeds in orange pods; the crimson and rose pink fruit of the burning-bush—did

Moses see its cousin in the desert?—drooping on long peduncles; and the drooping cymes of orange and scarlet berries of the woody nightshade, *Solanum dulcamara*, give a glory and a vividness to the tangled masses of

vines and shrubbery that advertises the swamp for what it is, one of Dame Nature's own banquet halls for the winter birds which we will not be able to entice to our feeding stations in the gardens until they have exhausted

the bounteous feast here. As we go homeward, the cobwebs of the week's work cleared from our brains, we wonder again that any inventor of theological system should have guessed that this beautiful world was made solely for mankind: witness that while we in America may be skimping our food to humanely send it to starving Europe, this nice old lady, Mother Nature, whose realm we have been exploring this winter day, has laid a banquet in every swamp and bog and woodland tangle clear across America, that her wild, joyous little animated airplanes and concert givers may have plenty



CAT-O-NINE TAILS WITH DRIED STALKS OF MARSH-MALLOW BEHIND, THEIR SEED PONDS RATTLING IN THE WIND

to eat through the long sleep-time of plants and insects. And were it not for her birds and her insects, notably the bees, we'd have no crops to send to starving Europe. So we conclude the dear old lady must love us, too.

A NATIONAL PARK TO HONOR ROOSEVELT

THE suggestion made by Charles Lathrop Pack, President of the American Forestry Association, that a great national highway be named in honor of Theodore Roosevelt, has met with popular approval from coast to coast as evidenced by cordial expressions and endorsements in the press. This is closely followed by a sentiment in favor of naming one of the National Parks in honor of Mr. Roosevelt also and Senator Phelan, of California, makes this definite by the introduction of a bill to create a national park on the western slope of the Sierra mountains "to be dedicated as a national memorial to Theodore Roosevelt."

This is a departure from the principle hitherto maintained in the matter of naming national parks, but sentiment favoring it is strong. Robert Sterling Yard, chief of the educational division of the national park service, is an earnest advocate of the proposal. He says:

"Senator Phelan's selection of a national memorial to Roosevelt is remarkably appropriate in many ways. California's memorial to John Muir, her own naturalist, author and prophet of the out-of-doors, was a trail over the crest of the Sierra from Yosemite valley to the summit of Mount Whitney, the loftiest peak in the United States.

"The nation's memorial to Roosevelt may well be the 1,600 square miles which inclose America's greatest

grouping of stupendous rugged mountains, her most exuberant valleys, her most luxuriant forests, and a million trunks of the giant sequoia tree, including the General Sherman tree, biggest, oldest and lustiest living thing in the world.

"This proposed national park, which slopes westward from the crest of the Sierras eighty miles or so south of Yosemite, is regarded by the Department of the Interior as the greatest in some respects that America can produce. No name has yet been chosen for this park; it was difficult to find one which carried the idea of its superlative ruggedness and vigor. The name of Roosevelt seems to epitomize and express these characteristics."

EMMETT D. GALLION, law partner with the late Senator Daniel, of Virginia, and for many years connected with the Interior Department, left a will bequeathing his entire estate, consisting of 750 acres of valuable timber land at Green Bay, Virginia, to the State forest service of Virginia.

All of testator's property, real and personal, is given to the State of Virginia for the benefit of its State forest reserve, his possessions to be used as a forestry reservation under the management of the State Forestry commission.

Forestry for Boys and Girls

by E. C. Cheyney

THE PINE WOODS FOLK

SQUEAKY CHIPMUNK COLLECTS SOME SEED

NOW that Squeaky Chipmunk had learned the proper time to collect pine seed for his winter stoves, the next thing was to get the seed. He was sitting out on the old pine log which formed the roof of his cozy little home and he was talking over the problem with Mrs. Squeaky who was squatting comfortably in the doorway.

"I ought not to have stolen that cone from Chatter Box the other day," said Squeaky sadly. "If it were not for that, I think he would cut me down some cones when he cuts his own."

"Maybe he will not find all that he cuts down," said Mrs. Squeaky consolingly.

"He may overlook a few," said Squeaky, "but very few unless he cuts a great many at a time. Then he sometimes loses track of them."

"Oh, well," said Mrs. Squeaky trying to comfort him, "he surely will not cut them all, and when the cones open on the trees and the seeds fall out we can gather them up."

"Yes," said Squeaky, "we can always get them that way, but it is very slow work and very tiresome. Here comes Chatter Box now."

They both sat very still and watched Chatter Box, the red squirrel, come bouncing through the woods towards the big Norways. He ran straight to the tallest one, ran up it a few feet, and stopped to look around. He immediately saw the two Squeakys watching him.

"So there you are, you little thief," he called to Squeaky, "waiting for a chance to steal some more of my cones are you?"

"No," Squeaky assured him, "I am not going to steal any more. I would not have stolen that one the other day only I got so hungry watching you eat that I simply could not stand it

any longer. I was wondering whether I could not get you to cut me down a few while you were up there."

Chatter Box climbed up a little farther and took a seat on the stub of a limb.

"I like your nerve," he said from his new position. "Steal from a fellow one minute and ask him to help you the next." He looked at Squeaky sharply with his bright little eyes and paused. The next thing he said made Squeaky fairly jump for joy and then feel very much ashamed, indeed. "But," he continued, "I suppose I might as well cut you down a few just to be neighborly, for to tell you the truth I did not intend to eat that cone you stole the other day anyway. I had had enough and was going to give it to you."

With that he scampered on up to the top of the tree and began cutting off cones at a great rate. They fell so fast that it seemed to be almost raining cones.

"Help yourselves," called Chatter Box, "there are plenty of them."

They did not wait for a second invitation. They scuttled off into the brush and were soon carrying in cones as fast as they could run.

Pretty soon Chatter Box came sliding down the tree to pick up some for himself.

"Thank you ever so much, Mr. Chatter Box," said Mrs. Squeaky politely. "It would have taken so many days to pick up this much seed loose on the ground."

"That's all right," said Chatter Box. "I always lose a great many anyway. All of us do. We are forgetful and we forget where we have hidden them. Do you see those three big trees over there so very close together? My great-great grandfather planted those. He buried a cone there and forgot it. Those three are the only ones left."



"Isn't that wonderful," said Mrs. Squeaky. "You must feel very proud of him now. I have often wondered where those bunches of little trees came from."

"That's the way it happens," said Chatter Box pleasantly, "they have come from forgotten squirrel caches.

So you might just as well have the ones I would lose and I'll be more careful with the rest."

He scampered off to collect some cones for himself and left Mrs. Squeaky to explain the mystery of the little groups of pine trees to her husband.

THE BALSAM AND THE BIRCH

Said the little balsam seedling to the big white birch
 You tower up above me like the spire of a church,
 But the day is fast approaching and it's not far away
 When I'll be growing faster than you dream of today.
 I shall still be growing upward when you have reached your height
 And then I'll drop my leaves on *you* with all my might!

THE CONIFERS WHICH ARE NOT EVERGREENS

(ANSWER TO BOY SCOUT QUESTION NO. 1)

THERE are in the United States just two genera of coniferous trees which drop all of their leaves, or needles, in the winter like the broadleaved trees. All the other conifers, or cone-bearing trees, drop some of their needles every year, but always retain enough of them to be called evergreens.

One of these genera is the larch, of which there are three native species, one in the lowlands of the Rocky Mountains and the West Coast, one near the timber line on the very high mountains of the west, and one, the tamarack, in the swamps of the Northeast and around the Great Lakes. The needles on these trees turn a quite brilliant yellow in the fall, about the time that the hardwood leaves are turning, and later fall off, leaving the tree bare through the winter. The fresh, green needles of spring, arranged in rosettes on little bumps along the twigs, make them very pretty.

The other genus, of which there is only a single species, is the bald cypress. It is one of the largest trees in the Eastern United States, and is found only in the swamps of the southern states. Like the larch, it sheds its needles and many of its smaller twigs in the fall and remains bald through the winter.

It has another and very interesting peculiarity. Since its roots are almost continuously under water and therefore very much in need of air they send up peculiar growths, resembling irregular cones, to the surface of the water. These are known as "cypress knees" and there are often dozens of them rising from the roots of a single tree. Where the water is deep the roots are tall, where the water is shallow, they are short. If you wade around a cypress tree, you will certainly discover some of the knees that are below the surface of the water, even if you do not see any above it.



SNOW IN THE WOODS

(ANSWER TO BOY SCOUT QUESTION NO. 2)

THERE will probably be a great difference of opinion as to the relative amount of snow in the woods and in the open, depending upon the time of year that the observations were taken. Owing to the tree canopy, the radiation from the earth and the shade, the temperature changes more slowly in the woods, and it is never quite as hot or quite as cold as in the open. If there is no sunshine, the first snow in the fall will probably disappear more rapidly in the woods than outside, but with sunshiny days and the cooling off of the ground the shade in the forest begins to tell. Later snows last longer in the woods and accumulate there so that toward the end of the winter the snow lies much deeper in the woods and lingers there for many days after it has disappeared in the open fields.

PROBLEMS FOR NEXT MONTH

- (1) Does the tamarack or cypress or cedar grow faster in the swamp or on high ground?
- (2) An ash and a sugar maple are growing close together, which one keeps its shape the better?

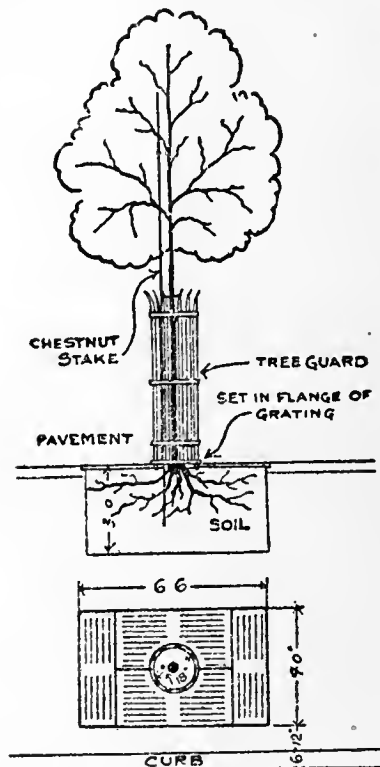
GRATING SOLVES CITY TREE PROBLEM

TO INDUCE trees to grow and flourish in city streets and small parks has always been a hard problem for foresters and city beautifiers. Even now, though great progress has been made, none is hopeful of producing large trees or prolonging their lives more than a comparatively few years. The chief obstacles to tree growth in city streets are lack of root room, scarcity of moisture, and the quick depletion of soil fertility which cannot be renewed through asphalt and cement. Even where a large opening about the tree trunk is left in the paving material, the tramping of myriads of feet soon renders it almost as solid as the stone sidewalk.

Paris was one of the first cities to seek and find means for prolonging shade tree life. The initial move was to cover the open space about the tree trunk with an iron grating that sustained the foot traffic and prevented packing. This idea was taken up and extended by other cities till now New York has a system in vogue a little in advance of all others. This city had to contend with not only the tree troubles of other cities, but there is hardly a spot in Manhattan where the natural rock is not within a few feet of the surface.

The accompanying illustration gives a detailed sketch of a tree-planting specification under which the Manhattan Park Department contracts for the work. First, an excavation 4 by 6 feet and 3 feet deep is made where the tree is to stand. This is filled in with good quality soil to within six inches of the top and the tree roots well tamped. An iron grating in two parts the full size of the excavation, with an 18-inch circular opening for the tree trunk, is then set in, resting upon the sidewalk

material. This large area of grating lets out gas, steam, and other harmful substances that are constantly escaping from under ground pipes and which are harmful to tree roots. It also allows a considerable amount of rain water to reach the roots and permits aeration of the surface soil under the grating. Mr. J. S. Koplan, the park forester, has devised a flat steel cultivating tool with which the soil under the grating may be stirred and loosened two or three times a year, which also prepares it for the reception of liquid fertilizer poured through the grating.



**A Way to Keep City Trees Alive,
Showing the Grating to Save
the Roots from the Pressure
of Countless Feet.**

Mr. J. P. Morgan was one of the first New Yorkers to try the new device. Trees planted in front of his residence in Madison Avenue several years ago are doing nicely, where trees set under the old plan had invariably failed. In Kenmare Park, at Kenmare and Lafayette streets, the Park Department has a plantation of fine trees, each with an 8 by 8 foot grating, the larger area being used because of the poor natural soil conditions. One of the newest and most attractive plantations of street shade trees has recently been completed by the American Geographical Society around its building at 156th street and Broadway. In this instance, semi-circular wrought iron grills, with a 6-foot diameter at the curb line, have been used. The trees are 8-inch Oriental planes, 30 feet high, selected by the City Park Department from among hundreds in the nursery. There are eleven of the trees, and the fact that Oriental planes were selected proves that that park forester does not expect another such severe season as last winter, when nearly all the plane trees in the city were killed by the cold.—*New York Times*.

TRENTON'S BIRD-HOUSE BUILDING CONTEST

BY M. M. BURRIS

CITY FORESTER, TRENTON, N. J.

BELIEVING in preventive medicine, and knowing that our native insectivorous birds are a strong factor in the suppression of insects attacking our trees I urged a campaign for the starting of the bird-house building contest.

Park Commissioner Burk was very interested in this campaign and was willing to offer prizes for the best bird-houses. We enlisted the services of Mr. W. R. Ward, director of Manual Training of Public Schools, and our plans for a lively campaign were soon formulated.

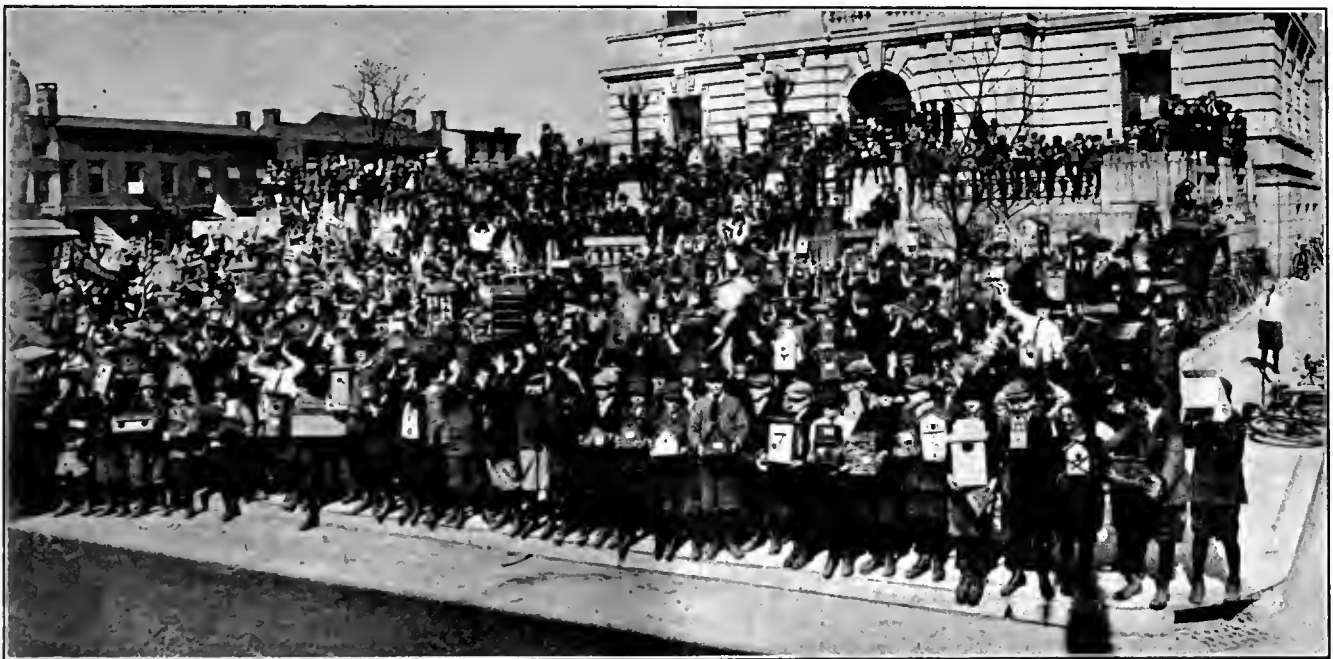
It was decided to open the contest to the boys of the fifth, sixth and seventh grades. The following announcement was sent out to the schools:

1. Every bird-house must be suitable for one or another of the following birds: Bluebird, robin, chicka-

prizes. We were successful in instilling civic patriotism into the hearts of about a thousand anxious boys who were soon ready to start with their saws and hammers.

But before they started, they were told that these bird-houses were to be built from scrap or waste lumber, boxes, branches, logs, or anything which could be used.

The boys responded good and strong. About a thousand boys started in the contest. Soap boxes, tin cans, scrap lumber, buckets, funnels, flower pots, logs, bark and every other conceivable material which could be worked into a bird-house were brought into the manual training rooms. The boys were busily engaged studying plans of bird-houses which we had prepared for them, and they soon flocked to the Public Library in search of information regarding birds and bird-houses. They



PROUD TO POSE FOR THEIR PICTURES

This picture shows some of the boys who took part in the contest and the bird houses they built, standing in front of the Municipal Building.

dee, white breasted nuthatch, house wren, martin, song sparrow, phoebe, red-headed woodpecker and sparrow hawk.

2. Only boys in the fifth, sixth and seventh grades in school may enter the contest.

3. All bird-houses must be well constructed and properly painted or otherwise covered to protect them from the weather.

4. The contest closes April 1, 1918.

5. All bird-houses are to be given to the City of Trenton to be placed in the various parks.

The boys were told that by entering the contest they would have lots of fun, learn something about birds, help to attract the birds to our city, and might win a prize. Very little emphasis, however, was laid on the

were told to be original and not to copy each other's designs. They were given the necessary data for the design of the house for whatever bird they were going to construct it, but the details were left for them to decide upon.

The boys were soon busily engaged with their tools—all of them interested, heart and soul in this project. And when the contest closed about twelve hundred bird-houses were completed. A display of unexpected skill in design and construction. Indeed, they were truly the work of craftsmen.

They were proud of their work and they were granted the privilege of a parade. How proud they were as they marched to the City Hall, each boy carrying his own bird-house. Some of the bird-houses were so large that

little carriages were employed to cart them in the parade.

The boys were lined up in front of the City Hall, and Commissioner W. F. Burk, in the name of the city, thanked them for their act of civic patriotism. The boys were glad in having done their bit, a photograph was taken of them with their bird-houses and is here reproduced. The boys then brought their bird-houses to an exhibition hall in the heart of the city where the bird-houses were displayed.

Three prominent citizens were selected to act as judges. It was originally planned to give only twenty prizes, but it was so difficult to pick the winners, that the judges decided to give additional special prizes. Crowds thronged to the exhibition hall and the bird-house display was the talk of the city.

The bird-houses were carted over to the parks

where a portion of them were placed on the trees. Not only are they of beneficial value but they helped beautify the parks. Commissioner Burk distributed them also to the various state institutions and to residents of the city who had suitable places for them. The Boy Scouts put up more than a hundred bird-houses on Park Island which they use as their camping grounds in the summer. The demand for them was so great that some were even sent

to Long Branch. Yes, we were very proud of the results. The boys learned a good deal about birds and became ardent admirers of them. This enterprise brought to the city twelve hundred bird-houses, at no expense. Trenton has responded to the cause of our feathery friends and promises to be their protector.

Without the co-operation of Commissioner Burk and Director Ward, the campaign would not have been such a success. Commissioner Burk's mere presence in the school was an inspiration to the boys. He appealed strongly to the boys and they responded. Director Ward had a very efficient staff of teachers in his manual training department and his services were indispensable to the cause.

As a fond lover of birds, and appreciative of their power of insect control, I was greatly satisfied with the results of this campaign.

A Bird Fountain For Roosevelt

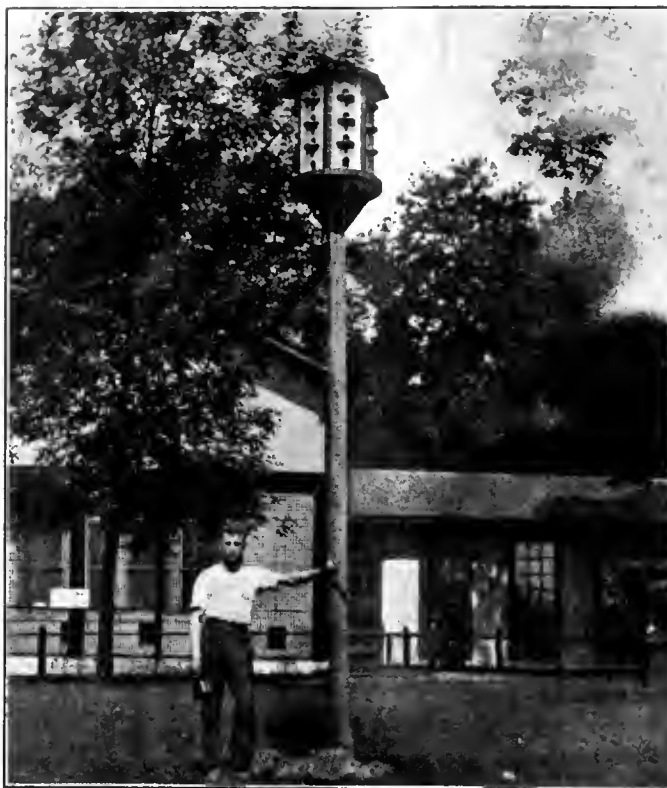
The National Association of Audubon Societies and its affiliated State Organizations, Bird Societies and Sportsmen's Clubs throughout the country, will at once begin the work of providing for the erection of a notable work of art, to be

known as the Roosevelt Memorial Bird Fountain. The plan was originated by T. Gilbert Pearson, the Secretary of the Association, and is being enthusiastically received

by bird-lovers all over the country, for Colonel Roosevelt was one of the most forceful champions of wild life conservation the world has ever produced.

It is understood that the most eminent sculptors in America will present plans for the memorial bird fountain. Its

location will be probably in New York or Washington City. A National Committee of Nature-Lovers and Sportsmen will advance the project and Mr. Charles L. Pack, President of the American Forestry Association, has accepted a place on this committee. Contributions for the fountain fund may be sent to Dr. Jonathan Dwight, Treasurer, 1974 Broadway, New York City.



A PRIZE MARTIN HOUSE

Best of all, it was built by a deaf and mute boy of the sixth grade.



THE PRIZE WINNERS

These attractive bird houses were the ones that carried off the trophies.

FORESTRY IN DIXIE

IF HORACE GREELEY had been a forester and had lived in 1919, his famous advice to the young American would have been "Go South, young man, go South!" and to the young Southerner, "Stay South, young man, Stay South!" For if ever there was a field and an opportunity for the ambitious forester, it is in the old South, from Virginia and Missouri to Florida and Texas. Not only is there a field for the forester, but more important yet, there is a wonderfully wide field for forestry. While the East, under compulsion of a real dearth of local timber supplies, has for fifteen years been practicing at least the rudiments of forestry; and while the West, under government ownership of immense bodies of timbered land, and under the scourge of timber-destroying fires, has for as long, or longer, studied the problems of forest conservation and applied their solutions, the Southeast has, with a few notable exceptions, not yet awakened to the need for forestry.

But the South will not long remain blind to this great movement, and can already point with pride to 1,837,000 acres of National Forests, in Virginia, North Carolina, South Carolina, Georgia, Alabama, Florida, Tennessee and Arkansas; to state forestry departments and forestry

associations in Virginia, West Virginia, North Carolina, Tennessee, Louisiana and Texas; and to instruction in forestry in the state colleges of North Carolina, Georgia, Tennessee, Missouri, Louisiana and Texas. But with no state forestry department in eight Southern States, South Carolina, Georgia, Florida, Alabama, Mississippi, Arkansas, Missouri and Oklahoma, and a total forestry appropriation in the six named states now having departments of but \$42,900 in 1918, there is presented to the thoughtful Southerner a pressing need for increased effort and a determined campaign for forestry legislation, study and action.

Never can there be a more propitious time for pushing forestry in the South. In recent years a great awakening has taken place to the vast acreages of waste and idle land—cut-over and swamp-land—that lie within the boundaries of the Southern States. Beginning with

the Cut-over Land Conference of the South, held in New Orleans in April, 1917, a powerful movement has gained headway, constantly looking to the development of the South's greatest single asset, her warm and fertile soils. It is but natural that in this development the greatest prominence has been given to those uses of the soil, farming and grazing, that promise an immediate cash return. There has been a natural tendency, in the first flush of their enthusiasm over their newly discovered asset, for Southern land owners to class all their cut-over lands together as valuable farming soils, and in the absence of anyone to tell them differently to look upon the possibilities of tree growing as too unremunerative to be worth consideration. Now is the time for the forester to come forward and show the owner of young second-growth timber the value of his property, to point out to him how fast it is growing, how valuable it will shortly be, how simple a thing it is in the South

to renew our fast-disappearing forests. Now is the time, before the land speculator can get in his deadly work on a large scale, for the forester to present and push his program of land classification and thereby effectively prevent the repetition of that great economic and social



SOME OF THE FORESTERS WHO ATTENDED THE BIG MEETING AT JACKSONVILLE

tragedy which elsewhere has followed attempted agricultural development of land that never should have been farmed. Now is the time for the forester to link together in the public mind fire protection for improvement of the range and enrichment of the soil, and fire protection for the encouragement of second growth.

The conference of Southern foresters held at Jacksonville, Florida, on January 3rd and 4th, with a field trip on January 5th, brought out all of the above mentioned points. That meeting, engineered in part by the Louisiana Department of Conservation (as was last year's meeting at New Orleans, the first meeting ever held in the far South of professional foresters), and in part by Sydney L. Moore of the Sizer Timber Company, of Jacksonville, and Austin Cary, of the United States Forest Service, was remarkable by reason of three things: First, the attendance of the state foresters of

six Southern States, as well as members of the United States Forest Service, professors of forestry and other foresters working in nine different states; second, the presence and active participation of the Secretary-Manager and Assistant Secretary of the Southern Pine Association, the Secretary of the Georgia-Florida Sawmill Association, and the Secretary of the Turpentine and Rosin Producer's Association; third, the active interest and wide connections of the Florida delegates, who included the manager of the Florida Tick Eradication Committee, the chairman of the Conservation Committee of the Florida Federation of Women's Clubs, and several state officials and members of the Florida legislature. We venture to say that the meeting received wider publicity from the trade journals and newspapers of the country—thanks to the initiative of those agencies in having representatives in attendance, than any previous forestry event taking place in the far South. The proceedings of the meeting, which were conducted informally with few prepared papers, will be gotten out in mimeographed form by R. D. Forbes, Secretary of the

Conference, Department of Conservation, New Orleans, Louisiana.

The topics under discussion included "Forest Investigations," "Railroad Fire Protection," and "Publicity and Education," on the first or professional day's sessions, presided over by State Forester Holmes of North Carolina, in the absence of Col. Henry S. Graves, Chief Forester of the United States Forest Service, who was ill. On the second, or open, day's sessions, Secretary J. E. Rhodes of the Southern Pine Association presided, and started off the meeting with the remarkable statement that within five years 3,000 southern pine mills would cease operation because their stumpage will be exhausted. "Forestry and the Forest Industries," and "Cut-over land Utilization," occupied the meeting, prior to a discussion by the Florida delegates of a proper forestry code for that state. The meeting came to an end, except for a most enjoyable field trip to Starke, Florida, on the following day, with the passage of appropriate resolutions, embodying most of the ideas presented at the beginning of this article.

THE FORESTRY SITUATION IN NEW SOUTH WALES

THE special Australasian correspondent of the *Christian Science Monitor* writes from Sydney that the need for a complete and consistent state forest policy in Australia has occasioned much recent legislation on the subject, culminating in the new Forestry Act of 1916, which repealed the old Act of 1909, becoming law on November 1, 1916. The new act embraces the most advanced measure of forestry legislation yet introduced in the Commonwealth of Australia, so that it is now made possible to create and maintain a progressive, consistent and suitable system of forest management.

By the provisions of this act a new policy was framed for the allocation of the duties of the respective commissioners, systematizing the methods of control to be exercised by them. As an outcome of this, it became necessary to construct machinery for the performance of the wide and important functions imposed upon the commissioners, including the training of officers, the demarcation and survey of forests, research work, commercial development, including the conversion and sale of wood; the introduction of system in administrative methods and business management. So far as circumstances and financial limitations have permitted, this scheme is now in operation.

A report upon the period of transition between July and October, 1916, when forestry was dealt with as a branch administration of the Department of Lands, and November, 1916, to June, 1917, when the business was transferred to the control of the Forestry Commission appointed under the Act of 1916, has been issued recently under the supervision of the Chief Commissioner for Forests, Mr. R. Dalrymple Hay.

The initial steps taken during the period covered by the report, toward the inauguration of the new admin-

istration in conformity with the Forest Policy may be briefly stated as follows:

1. The preparation of regulations under the new act. These were framed by the commission, and having been approved by the Executive Council, were gazetted to take effect from August 1, 1917. In a general way, these regulations outline the administrative scheme, and, in detail, direct the procedure.

2. The organization and training of a staff to undertake forest survey as a preliminary to the laying down of forest working plans. A number of trained surveyors are still engaged in this work.

3. The selection of a site for the forest training school, the design and erection of suitable buildings, and the selection of a principal for the school.

4. The initiation of research for the investigation of the pulping qualities of woods, for ascertaining their value for manurial potash, and for ascertaining by destructive distillation their value for the production of various by-products.

5. The creation of a commercial department was inaugurated by the purchase of two saw mills, which are now being worked satisfactorily as an industrial undertaking upon strictly business lines. Arrangements have been entered into with various government departments for the supply from these mills of sawn, hewn, and round timber, required for various public works.

6. The partial reorganization of the administrative arrangements, as far as funds allowed, has been affected including the establishment of an accounts branch with necessary staff and the appointment of a leasing officer to administer tenures which have already been, or in future may be, granted in connection with state forests. To provide consistency in the administration generally throughout the forests service, a comprehensive manual

has been compiled and circulated for the instruction and direction of all concerned.

The timber industry, in common with others, has of course been seriously affected by the world war, the consequent disorganization of markets, and the restrictions of oversea shipping. It is therefore in natural sequence to these conditions that forest activities should have declined in volume and value, and forest revenues decreased. In the same connection, the efficiency of the Forest Service has been materially reduced by the enlistment for active service of a large proportion of the trained staff. Despite all obstacles, however, the new scheme of forestry may be said to have been fairly launched, and with every promise for progress; and there is already undoubted evidence that the introduction and operation of the new policy, with its measure of independent control, must prove of value to the State. Systematization and stability which were impossible under the ruling conditions prior to the Forestry Act of 1916, make it probable that when activity in the timber industry is resumed and accelerated, as it must be after the war, the Australian forests will be more fitted to meet the expected enormous demand which will arise from the re-establishment of domestic and industrial conditions.

The business of the Commission now in hand, includes the following undertakings connected with the industrial side of forestry, which do not usually come within the scope of forest practice, viz: (a) Timber inspection; (b) Direct conversion and sale of forest products; (c) Sawmilling and timber supply, and (d) Utilization of prison labor.

A branch for the inspection, grading, and certification of timber by the Government has been in existence for many years, and is recognized as an essential in the timber industry, for the convenience of trade, and the satisfaction of timber purchasers.

In the regenerative treatment of forests, the practice has been adopted of converting any marketable wood in the areas under treatment, and in this way much waste and low-value timber is being utilized with profit. The business of direct conversion and sale of products is one that promises to extend considerably in the practice of state forestry. The business of saw-milling and timber supply is a recent development, rendered possible by the wider scope of the Act of 1916. Its primary aim is the supply of timber for Government purposes.

With regard to the utilization of prison labor, this scheme combines forestry with the work of reform; prison labor being employed on clearing and planting work near Tuncurry on the north coast.

A salient feature of the new forestry policy has been the training and specializing of the staff. Three licensed surveyors and one forest officer were trained in the methods of forest survey and assessment work. A graduate in engineering, of Sydney University, was added to the staff of the commission, to acquire experience in the forest system and to organize and build up the science of engineering as it applies to the opening up and development of the forests. One forest officer

was given a short course in the methods of afforestation and nursery practice. Three overseers were appointed for training in the duties of state forest supervision.

The Strickland state forest, which is to be attached to the Forest Training School at Narora, New South Wales, has been organized as a medium for the training of forest students. A commencement has been made in the research work in connection with forest products and by-products. Samples of wood have been submitted to laboratory tests to ascertain their cellulose and pulping qualities and arrangements have been made for destructive distillation of the principal native woods on a commercial scale, in order to ascertain the quantity and value of the by-products obtainable from them. This line of research will have an important bearing upon the problem of the utilization of waste, and upon the future of Australian forestry.

ENTHUSIASM FOR MEMORIAL TREES

IN ALL parts of the country popular interest is manifested in the American Forestry Association's plan for memorial trees to soldier and sailor dead and in the Association's similar plan for the planting of trees as memorials to Colonel Roosevelt. Reports of constantly increasing enthusiasm reach Washington by every mail. Probably no memorial project growing out of the European war has met with such spontaneous approval.

Especial interest attaches to the activity of the Boy Scouts of America in planning tree memorials to Colonel Roosevelt. A million pine trees will be set out in the Interstate Park by the Scouts of New York City. Several troops of Manhattan Borough Scouts are endeavoring to have a grove of trees planted in Central Park to represent the formation of a troop of scouts in the regulation four patrols and called the Roosevelt Scout Shelter.

Special Roosevelt Scout services will be held in Philadelphia on April 5th, following which each troop will plant a tree. Columbus Scouts will plant Roosevelt Grove on the State House grounds in the center of the city. The Boy Scouts in Everett, Washington, are to plant trees on the highway from Skagit to King Lines in honor of the soldier and sailor dead, and they now ask that trees be included for their chief scout citizen. Chicago is planning for a fitting memorial in the forest preserve and the scouts are eagerly working on the plan. In Syracuse, New York, the scouts will plant a number of "Roosevelt elms" in each of the city parks. Boy Scouts in Rochester have put it up to the park commissioner to designate the kind of trees to be planted and their location in the city parks. A row of Roosevelt trees will be planted in Marion, Indiana, and the Boy Scouts will carry out a public ceremony at the time of planting.

PLANT MEMORIAL TREES

ROADSIDE PLANTING AS A MEMORIAL TO OUR SOLDIERS AND SAILORS

BY PROF. R. B. FAXON

WITH the interest that is being shown over the entire country at the present time regarding the planting of trees along our highways and through many of the cities, towns, and villages to serve as memorials to our soldiers and sailors, it is interesting to note that New York State has definitely under way a plan whereby the unit of the State Highway running from Syracuse to Utica is to be completely developed and the planting so marked with suitable tablets to commemorate the brave deeds of the soldiers and sailors in New York State. This unit of the highway is approximately sixty miles in length and offers exceptional opportunities not only to serve as a most fitting memorial for the State's sons, but also to act

whereby this initial demonstration planting may be put into immediate effect, but that a further appropriation be made for the carrying out of similar projects throughout various counties of the State. It is felt that no object could express more fully the respect and admiration held for these men than that of tree planting along the State Highway, for in the years that will come, each succeeding year will add to their glory and charm. Co-operation with other State bodies such as the Sons and Daughters



A SECTION OF COUNTRYSIDE WELL ADAPTED FOR TREE PLANTING

A NATIVE PLANTING ON A BEAUTIFUL CURVE OF ROAD

of the American Revolution is to be sought and it is hoped that New York State may find a worthy pride in its achievements along this line.

The matter of roadside planting, or as may be termed, the utilization of

our roadside areas, has been given considerable momentum during the past five or ten years, and should with this added incentive of serving as a memorial planting be brought to a point within the early future, when we may look for more definite results.

as a demonstration planting for other sections of the State interested in this work. The New York State College of Forestry, under its State-wide Extension Service, has co-operated with the New York State Motor Federation in the construction of this plan and at the present time the preliminary survey of this section of the highway is fully completed. It is planned during the coming year that not only the final planting plan is to be made available, but that active work in planting may be started. A bill recommending the planting along the State highways is soon to be placed before the State Legislature where it is hoped that not only a sufficient appropriation will be made available

There are many elements which enter into considerable prominence and importance in the matter of roadside planting and these should be given consideration if the greatest amount of benefit is to be secured from such plantings. It must first be recognized that tree planting along our improved highways, if properly done and maintained, will be of considerable practical value aside from that of ornamentation. That such trees can be of great

service in affording an added protection to the pavement by means of their shade, is acknowledged by many authorities when through the long hot summer months the roadway is subject to an intense heat, causing the pavement to dry out, and producing a large amount of dust. Each particle of dust thus blown away shortens the life of the highway to that extent. Trees can, in some instances be of service in keeping the drifting snow off the roadside along the more open stretches of highway through the winter season. In many cases where rows of well established trees have been found growing along the edge of a field, no depreciation in the value of the adjacent land was noticed in its use for crop purposes. In some cases where trees such as the Oriental Plane and American Elm have grown into immense specimens the land adjoining the trees for a distance of a rod or two has possibly been made less valuable for crop production, though the added value which such trees afford the entire field in the way of shelter from strong winds usually outweighs the loss of this small area for crop production. Many unsightly and barren strips composed of gravelly soil are found along

certain sections of our highways and on such areas it is usually found that little or no tree shrub growth is present on account of the very sterile condition of the soil. In such cases fertile soil must be brought in if we are to secure worth while results in our plantings. Embankments of varying size are also found along many of our highways and though in some instances a natural growth of native material such as sumac, birch, pine, etc., has completely covered these areas, in many places such embankments have been found in a very barren condition and it will take several years before they will be covered by native growth. In such instances artificial reforestation will be most satisfactory.



Photograph by Underwood and Underwood

AN AVENUE OF STATELY EVERGREENS IN BRITISH COLUMBIA

The planting of such trees as memorials to our soldier and sailor dead is advocated by the American Forestry Association. Surely there could be no finer tribute to keep fresh the memory of their heroic deeds. This beautiful spot is on the road to Emerald Lane—a line of evergreens one mile in length with a snow peak at each end, connecting Snow Peak Avenue and Emerald Lane.

needed to break up the longer stretches of views found along the roads and by an opening here and there create desirable views along various parts of the roadside. It is often found desirable to bring ones interest into the

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In arrangement of plantations especial care should be exercised in retaining and enhancing all desirable views from the roadside. In many places most charming vistas may be secured by a slight cutting through the underbrush, and in other instances plantings will be

needed to break up the longer stretches of views found along the roads and by an opening here and there create desirable views along various parts of the roadside. It is often found desirable to bring ones interest into the

roadway itself, due to objectional features found along the highway or where the country is such as to be most monotonous in its character. In such instances heavy mass plantings of the trees or shrubs can be utilized on



BARE AND UNSIGHTLY WITHOUT TREES

A splendid argument in favor of tree planting along our highways.

either side of the highway cutting the view from the roadside, thus making the element of the picture the roadway itself.

An obstacle in our tree planting work which must be given due consideration in that along practically every main highway we are confronted with many overhead wires. That these are necessary is duly recognized and it no doubt will be many years before we can expect any adequate system of underground wiring throughout the countryside. In many places where this problem must be solved, trees such as the dogwood, hawthorne, sumac, and

willow may be planted to advantage, as such trees never reach a size which will interfere with the overhead wires. In other instances it has been found possible to so train the large growing species that their crowns may grow above the wires. Where tree planting is found impractical due to these conditions, it is always possible to mass in large clumps of shrub material, preferably of stock indigenous to the surrounding region. That we have such an obstacle before us should however not tend to



AN ATTRACTIVE BIT OF ROAD

Native sumach is used for this planting.

stop our efforts for more and better tree planting in such places.

The ultimate width of the improved highway is also a present-day problem, for it is realized that in many places where such improved roadways today are only fifteen to twenty feet in width, eventually with the greater



A SPLENDID EXAMPLE OF ROADSIDE PLANTING

These beautiful trees grow well above the overhead wires, which are sometimes quite hard to dispense with in the country.

use of motor vehicles a demand for a roadway of not less than thirty feet wide will be made. All planting work to be considered should be done so as to allow a pavement of this minimum width on all main highways and where the present roadway is not sufficiently wide to permit of any planting, immediate steps should be taken to secure additional land to be placed under the control of the State Highway Commission.

In many ways the maintenance of the tree planting is of greater importance than that of the planting itself. Ample provision should be made for the control of insect attack so prevalent in many sections of our most beautiful countryside, whether such work be under the control of the State, County, or Municipality. The matter of pruning and thinning of such planting should be amply provided for especially where the wire obstacle is at all serious so that when necessary cuttings are made they may be done under the direct supervision of a trained forester rather than by the usual ax and saw of the lineman whose only interest is in the question of good wiring.

We are most fortunate in the wide range of planting material from which to select for general roadside plant-

ing. It is usually found that no such limitations as are found in practically every city, town, or village, in the way of narrow streets and of buildings in close proximity to the street, need come into consideration in selecting our planting stock. The American Elm and the Sugar Maple have been planted through the Eastern part of the country greatly in excess of other varieties and where the Elm Leaf Beetle and other insects attacking the elm are not found, the continued use of this variety is recommended along the wider highways, for no other tree can add more to the dignity and charm of the roadside than this variety. The Norway Maple can and should be substituted for the Sugar Maple where the Maple Borer is present in any one region, as this does not attack the Norway variety. This tree grows into very symmetrical form and is coming into universal favor for both road-

side and town planting. In many respects the Oriental Plane is worthy of greater use where the winter conditions allow this variety to be planted. Various species of Walnut and Hickory are also recommended. In fact, many varieties of trees can be enumerated as being well adapted for roadside planting, though aside from the varieties mentioned above, those which should be brought into greater prominence are the Scarlet Oak, Pin Oak, White Ash, Horse Chestnut, Willows in variety, Hackberry, and Dogwood. For the secondary or shrub plantings it will be found in most cases that large masses of native material is desirable. If each state in making such plantings might be held in its selection to plants indigenous to its own particular locality, the effect would be most delightful and such plantations should grow luxuriantly under a favorable environment. Such shrubs

as the Grey Dogwood, the Viburnums in variety, Highbush Huckleberry, Elders and Alders are typical of the native material found along many of the Eastern highways aside from the states so fortunate as to include in their list the charming Mountain Laurel. The native roses are also highly desirable for



A SHADY SPOT

Shade cast upon the roadside during hot summer days when travel is extremely heavy, aids greatly in making the highway more durable.

large mass plantings and their effect upon the roadside during the early spring is most pleasing.

That we have neglected the use of the conifers, especially the pine and spruces, in our roadside work is known to us all. Now that such plantings are to be carried out and demonstration plantings are being made which will, in a sense, serve as model plantings, we should most certainly include the conifers whenever possible and practical in our planting list. Long rows of pines along the roadside growing luxuriantly and perfectly at home in their surrounding have much to recommend themselves for greater use. A most delightful contrast is also secured by mixing the deciduous trees and shrubs with the conifers, thereby adding to the general effect of the roadside either in summer or in winter a warmth and charm pleasing to all.

The Welfare Committee for Lumbermen and Foresters in War Service has been notified of the arrival at Hoboken, February 12th, on the U. S. S. North Carolina, of the 12th Battalion, 20th Engineers (Forest). Also the 32nd Company, 11th Battalion, 18 officers and 850 men. They will remain at Camp Mills several days prior to their demobilization. These battalions were formerly of the 1st and 2nd Companies, 10th Engineers (Forest).

FEBRUARY---AND PLANT-LIFE STILL SLEEPS IN NORTHERN CLIMES

BY R. W. SHUFELDT, M. D., R. A. O. U., ETC.

(Photographs by the Author)

THROUGHOUT New England—indeed often throughout the entire State of New York—typical winter weather usually prevails during the entire month of February, with plenty of snow and ice everywhere. Rarely is the reverse the case; while, as we proceed southward and pass below the mid-tier of Atlantic States, the woods, the fields, the streams—one and all—appear very much as we see them in early spring still farther South. In eastern Virginia, for example, the meadows may remain green during some winters; and while most trees will have, many weeks before,

parted with their leaves, yet, here and there a few dandelions, and perhaps other flowers, have bloomed all through this month, in situations sheltered from the more searching winds of winter. It is needless to say that, as we proceed still further southward, for example into that land of flowers, Florida, the sequence of growing vegetation is perpetual.

To return northward again, however, we may, on one of our tramps along some roadside, meet with a Bittersweet vine (*Solanum dulcamara*), which, though it has lost most of its leaves, nevertheless has remaining



THIS IS AN AUTUMN SCENE AT THE NATION'S CAPITAL

Fig. 1—The waterfall at Pierce's Mill, in beautiful Rock Creek Park, Washington, D. C.

upon it bunches of its beautiful, bright red, ovoid berries—the latter having been overlooked by the birds that are fond of them, and are now in evidence of the plant's hardiness; these berries are of a rich dark green. In turning, they first become a fine yellow, passing to a deep orange, and finally to the brilliant scarlet noted above.

scientific name of the entire Nightshade family—the *Solanaceae*; while others claim that it is derived from *solamen*, consolation, solace, and so on, which has reference to the narcotic properties afforded by a number of the tropical relatives of this vine; and the genus is one containing an enormous number of species. The specific name appears, without doubt, to be derived from *dulcis*, sweet, and *amaras*, sour or bitter; for the juice of the vine most assuredly produces the double impression upon our sense of taste.

The common garden Nightshade or Morel bears black berries, the poisonous qualities of which have not been fully disproved. Perhaps it is just as well not to test this by chewing them and swallowing the juice. This vine is the *Solanum nigrum* of the botanics, and it is well-nigh cosmopolitan in its distribution. Its flowers are *white*. We have another vine we call "bittersweet," and it may be known in the autumn by its gorgeous



BITTERSWEET BELONGS TO THE NIGHTSHADE FAMILY (*Solanaceae*); RANK-SCENTED VINES. THE FRUIT OF WHICH IS OFTEN SAID TO BE EXTREMELY POISONOUS

Fig. 2—Linnaeus designated this vine as *Solanum dulcamara*; its elegant, red, ovoid berries are well known to us in the autumn.

This vine is also known by the common names of snake or scarlet berry; blue bindweed; nightshade; poison flower, and perhaps others. It would appear that the reputation it once bore of being "deadly poisonous" has, long ago, been exploded—surely none of its near relatives are, among which may be numbered the eggplant of our gardens, as well as the tomato and potato. In Figure 2 are well shown some of its graceful purple flowers, with their pointed, yellow centers. Often a few of these are found in good shape on the vine at the same time when the bunches of berries have assumed their gorgeous scarlet skins. Note the curious form of the leaves of this vine, with the little winglets near the base of each. Often we find this vine growing on our fences, or even upon some support or other in our backyards. Professor Gray states that the derivation of the name *Solanum* is not known, which, of course, applies to the



THE ASTERS OF THE *Compositae* CONSTITUTE A VERY NUMEROUS, NOT TO SAY PUZZLING GROUP OR GENUS TO STUDY. THEY HYBRIDIZE FREELY; BUT THERE APPEAR TO BE UPWARDS OF AN HUNDRED GOOD SPECIES OF THEM IN THE ATLANTIC STATES ALONE

Fig. 7—This is the common Purple Aster (*Aster patens*), also called the Purple Daisy. The caterpillar is the one the children call the "black bear." There is a triple-banded one like it—deep chestnut and black. They are the first species of larvae of this kind making their appearance in the spring.

yellow berries, which, when bursting open, have elegant scarlet seeds. A bunch of these is very decorative in a vase indoors, and their lasting properties are truly wonderful.

During this month of February, we will find that many plants have gone to seed, and a very interesting one among these is the Angle-pod, here shown in Fig-



SOME OF THE CLOSE RELATIVES OF THE MILKWEEDS ARE CLIMBING VINES, GROWING IN WET PLACES. THIS ONE, *Ganolobus laevis*, BELONGS RIGHT IN THAT FAMILY

Fig. 3—Angle-pod is the common name for this vine, the seeds of which are tufted as we find them in the true milkweeds (*Asclepias*).



SOME INTERESTING PLANTS ARE FOUND IN THE CROWFOOT FAMILY (*Ranunculaceae*), AND THE THIMBLEWEED OR TALL ANEMONE IS ONE OF THEM (*Anemone virginiana*)

Fig. 5—When this species of Thimble-weed goes to seed, its fruit-heads remind one of common, medium sized thimbles, as they are represented here in this cut.

ure 3. In dense thickets, along the banks of sluggish rivers and canals, it flourishes from Pennsylvania, westward to Illinois, and southward through Kansas to the Gulf. Although a “perennial twining herb, smooth, with opposite, heart-ovate and pointed, long-petioled leaves, with small flowers in raceme-like clusters on slender axillary peduncles” (Gray), it nevertheless has a seed-pod almost exactly like the one borne in the autumn on some of our species of milkweeds. When we open one of these pods, we find the tufted seeds, arranged almost exactly as they are in the pods of some of the slender-pod *Asclepias* of the Milkweed family (*Asclepiadaceae*). The vine has been called Angle-pod from its angled fruit, the name being derived from two Greek words meaning an *angle* and a *pod*.

The vine and its pod is of a specimen found growing on the banks of the Georgetown Canal, a little more than a mile west of Washington. Some day we will show what the flowers look like, when a clearer idea may be obtained of their milkweed affinities.

Some plants are especially beautiful and attractive when they go to seed, and they may retain this state throughout the entire winter. Among these we have in mind the common Daisy Fleabane (Fig. 4), an abundant roadside species in the region where it flourishes. These Fleabanes are closely related to the Asters of the *Compositae*, and the group contains such well-known flowering plants as the Horseweed (*E. canadensis*) and Robin’s Plantain (*E. pulchellus*). The name is composed of two Greek words meaning “spring” and “an old man,” referring to the hairiness of the stems when the plants are in flower,—that is, hairy in the *spring time*,—one of the *Senecio* names. Gray also gives *Eucrigeron*.

Referring to two of the Fleabanes, a popular writer at hand says: “That either of these plants, or the pinkish, small-flowered, strong-scented Salt-marsh Fleabane (*Pulchea camphorata*), drive away fleas, is believed only by those who have not used them dried, reduced to powder, and sprinkled in kennels, from which, however, they have been known to drive away dogs.”

In these February days, in the woods and fields from Maine to South Carolina,



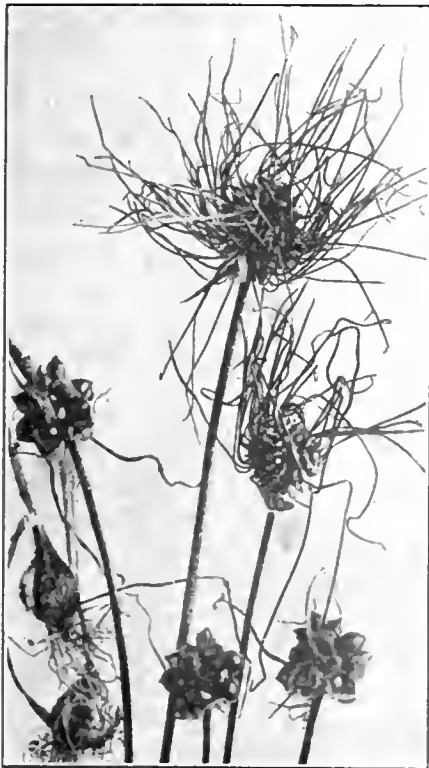
WHEN THE DAISY FLEABANE GOES TO SEED, ITS TUFTED FRUIT—FLUFFY BALLS OF A RICH TAN—CONSTITUTE ONE OF THE ATTRACTIONS OF THE LANES AND ROADSIDES

Fig. 4—*Erigeron annuus* of the great Composite family (*Compositae*), may be easily recognized by its hairy stem and the little leaf in the angle of its branching stems.



ALONG STREAMS AND BORDERS OF SWAMPS AND MARSHES IN NOVEMBER, THE WELL-KNOWN SHRUB WE CALL SPECKLED OR HOARY ALDER APPEARS AS SHOWN IN THIS CUT

Fig. 6—Alders belong to the Birch family (*Betulaceae*), the species here shown being the *Alnus incana* of the botanics.



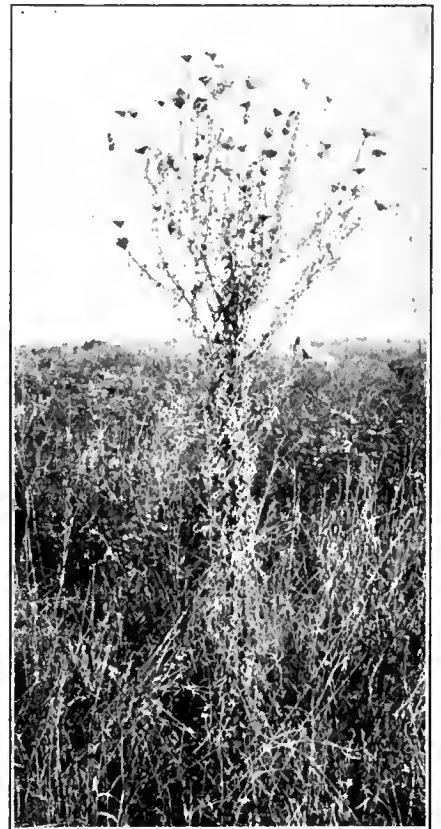
WILD GARLIC IS USUALLY FOUND GROWING IN WET MEADOWS, OR ALONG THE SHORES OF BAYS AND RIVERS, ALL ALONG THE ATLANTIC COAST LINE. WITH OTHER SPECIES, THEY BELONG TO THE LILY FAMILY.

Fig. 8—Numerous species of Wild Onions or Garlic (*Allium*) occur in our eastern flora. This is *Allium canadense*, the specific name being the old Latin one for garlic.

Greek and Latin derivation, "a corruption of *Naman*, the Semitic name for *Adonis*, from whose blood the crimson-flowered *Anemone* of the Orient is said to have sprung."

Sometimes we find the seeded Thimble-weed heads sticking up above the snow in the middle of the winter, or even when the snow is melting in the early spring. During this part of the year, too, the alder bushes along our streams and borders of our marshlands appear as they are here illustrated in Figure 6. This is the common or Speckled Alder, also called the Hoary Alder (*Alnus incana*). Commonly it is a shrub, while on the other hand some specimens may grow to become so tall and big as to really demand being relegated to the tree class. The

we often meet with the Thimble-weed, the plant having gone to seed at this season. (Fig. 5.) Many of us know it as the common tall anemone of the waste places, roadsides and brakes along the margins of the woods. Mathews says: "The flowers generally have five inconspicuous sepals, white or greenish white inside and greener outside; the flower-head, usually one inch or less across, is succeeded by the enlarged fruit-head similar in shape to and about as large as a good-sized thimble." Honeybees and bumblebees are the insects chiefly responsible for the fertilization of the Thimble-weed's flowers; but they are assisted in this by some very brilliant little flies (*Syrphidae*), which one may easily detect by watching the flowers when they bloom, about the middle of June and later to include August. We have a pretty long list of anemones in our flora, and they are all regarded with great affection by those who love the woods and fields. Our revered Professor Gray tells us that the name *Anemone* is of ancient



FREQUENTLY WE MEET WITH EXAMPLES OF THE TALL THISTLE (*Cirsium altissimum*) THAT HAVE GROWN TO BECOME TEN FEET IN HEIGHT; HERE IS A MARYLAND SPECIMEN THAT WAS FULLY THAT TALL

Fig. 9—Thistles, of which we have a great many species, belong to the *Compositae*. In their relations they stand next to the much smaller genus of Burdocks (*Arctium*), the flowers of which have a thistle-like appearance.

one in the cut—that is its twigs—were taken from a "shrub" fully ten feet in height. It is well known in the dendroflora of many parts of Europe, and the ancient Latins bestowed the name of *Alnus* upon it. We have several species of these alders in our country, as the Smooth Alder (*A. rugosa*), the Black Alder (*A. vulgaris*)—which is a tree sure enough—and the Seaside Alder, which is likewise a small tree. This last species is only found in Delaware and Maryland, not far from the Atlantic coast-line; it has also been discovered in Oklahoma (*A. maritima*). Then there is the Green or Mountain Alder (*A. crispa*) and the Downy Green, the *Alnus mollis*.



THISTLES GROW SO CLOSE TOGETHER SOMETIMES, THAT ONE CANNOT PASS AMONG THEM EXCEPT AT THE RISK OF MANY PAINFUL PUNCTURES FROM THEIR STRONG SPINES

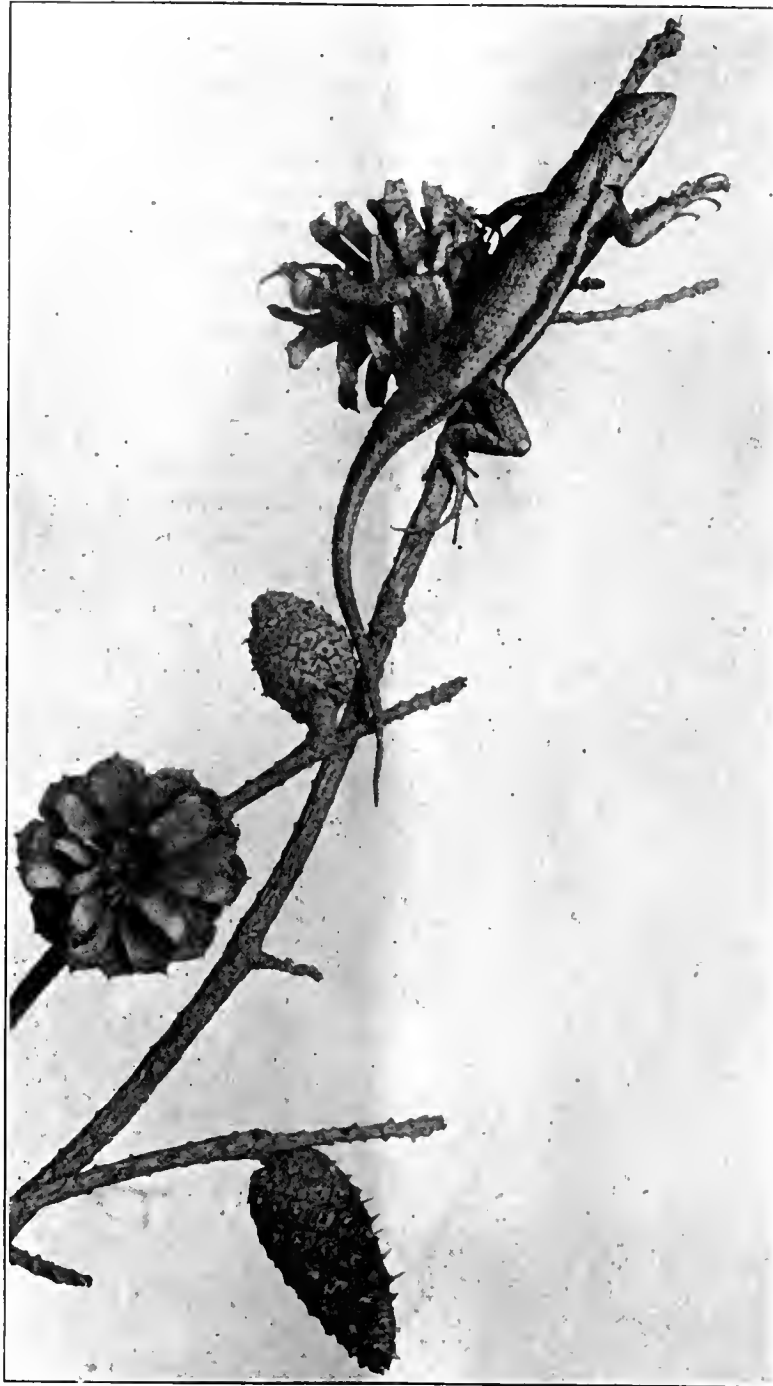
Fig. 10—This is a late autumn or early winter group of common thistles; and we cannot but admire their fruiting even though the plant offends in all other particulars.

Newhall says of the alders that they bear "staminate flowers, in long, drooping clusters, with three (sometimes six) blossoms, and four or five small bracts to each shield-shaped scale. Pistillate flowers, in oval or oblong clusters, with two or three blossoms to each fleshy scale. Scales or bracts, woody in fruit." Further on: "Fruit, in 'cones,' sometimes winged, scale-like, cluster. A scale-like nut." These woody scales and bracts in threes and the "cones" are shown in Figure 6 of the present article.

There are over sixty different kinds of asters in the native flora of the northern and middle Atlantic tier of States, and some of them support almost perfect flowers far into the late autumn; indeed, a great many of them, even the northern varieties, do not begin to bloom until October or early November. (Figure 7.) This is the reason some people have bestowed the name of "Frost-flower" upon them in the North, while further South they are known as "Starworts." As we know, the rays of many of the species are of a rich purple; but then there are other species in which they may be white, blue, or even pink. In the case of the "disk," it is usually yellow, but later on this may change to purple. Botanists have long been familiar with the fact that these asters are quite prone to hybridize; and, as a consequence, the limits between any two species is frequently but poorly defined. Asters stand about in the middle of the Composite family (*Compositae*), and are quite typical of this enormous group of flowers; in fact, it is our largest family of phaenogamous plants, or plants that have flowers developing both pistils and stamens, and, in fruiting, produce seed. Asters, like the daisies and black-

eyed Susans, fall in the ray-flower group of the *Compositae*—so called from the fact that the corolla is made up of radiating "petals" springing from the periphery of a central disk, which latter is composed of the true flowers; these are very small and tubular. By examining a daisy or an aster with a good hand lens, much of this will be revealed to you.

We speak of the corolla of an aster as being "strap-shaped" (*ligulate*), while in many other kinds of the *Compositae* it is tubular, as in the case of the flowers of the Ironweed (*Vernonia*). The Aster in Figure 7 of this article clearly exhibits all the characters mentioned. Wild Garlic (Fig. 8) is a plant that may persist far into the autumn, and it may be readily recognized—as an onion—by its small bulb with fibrous coats, closely resembling a small onion. Two of these are shown in the figure, which is a specimen collected along the Virginia banks of the Potomac River, not far from Mount Vernon. Like all the onion group, all parts of the plant are strong-scented and pungent. The long, slender, cylindrical stems spring direct—in any single plant—from the apex of the bulb, as shown in the cut, and its upper extremity supports the extraordinary appearing flower head. These last are often few in number and sometimes even absent. There are some eight or ten species of the Wild



HERE IS A MOST BEAUTIFUL AND, IN THE CASE OF THE MALE, AN ELEGANTLY COLORED LITTLE LIZARD FROM FLORIDA

Fig. 13—Wood's Swift (*Sceloporus u. woodi*), of which this is a male, has only been very recently described.

Onions, Leeks, or Wild Garlics in the northeastern United States, and they are interesting plants to study.

Of all the groups of plants in the Middle-States section of our country, none brings more home the fact that winter has—as yet—not fully made up its mind to leave us—than the Thistles. Take, for example,

the big fellow here shown in Figure 9, and note how it towers among a perfect army of different species of plants, every one of which has gone to seed several months or more ago. Nearly all the seeds of this plant have been borne away by their feathery tufts, and there is scarcely a single meal left for some solitary goldfinch that may, with his long undulating



OUR SAW-WHET OWL IS A VERY ATTRACTIVE LITTLE BIRD, AND IN FEBRUARY WE MAY OCCASIONALLY MEET WITH ONE IN THE WOODS

Fig. 12—His place is among the smaller members of his family, and ornithologists call him *Cryptoglaux a. arcadica*. He sleeps nearly all day long.

dips a-wing, come that way. One naturally associates these goldfinches with the thistles-gone-to-seed—occasionally so vividly that it requires no stretch of the imagination to hear their plaintive notes, although the little black-and-yellow fellows may be nowhere near. This is especially the case when the plants are growing in masses, as they are here shown in Figure 10.

Aside from studying flowers when they are in the enjoyment of their perfect and normal condition, there is another most interesting chapter in their lives which deserves our earnest consideration and exhaustive research. Reference is made to their diseased states, or other manifestations in them indicating various departures from the healthy ones. This is a very large and very important subject, and much attention has already been paid to it by phytopathologists, or those who take into consideration the diseases of plants, shrubs, and trees.

Diseases of a great many different natures may attack any part of any vegetable growth—as the stem, the

trunk, or any of the branching portions. Flowers, seeds, pods, leaves, roots, bark—indeed any of the numerous structures of plants are subject to disease, to the attacks of parasites, to fractures or other injuries, burns and scalds, lightning strokes, strangulations, impact of foreign bodies, drowning effects of excessive solar heat, and many other liabilities. In Figure 11 we have an example of the effects of an attack on the part of some parasite on the leaves and flowers of the common wild Sunflower. In a previous number of *AMERICAN FORESTRY* it was



SOME PLANTS ARE PARTICULAR VICTIMS OF PARASITIC GROWTHS; HERE WE HAVE SOME VERY REMARKABLE ONES ON THE WILD SUNFLOWER (*Helianthus decapetalus*)

Fig. 11—These big bulbs are caused by the sting of an insect, the larvae of which we may find by cutting one of them open. The flower is frequently included in the pathologic growth, as may be noted here.

shown how oak-galls were produced through the attack of certain species of insects, and what an important industry resulted from ascertaining the value to man of these products.

February, especially in the more northern States, is the month when the owls make themselves heard in the land.

The nights are cold; the moon shines with a peculiar brilliancy, and we are liable to have a snow-storm or two. It is then that we hear the familiar notes of the owls, either late of an evening or during the early morning hours. Of these, perhaps the notes of the Screech Owl are most often heard, and next to this species, maybe, the Great Horned Owl. Once in a while, however, come the curious notes of our little Saw-whet Owl (*C. a. arcadica*), although this bird may most often be heard during the daytime. The notes so closely resemble the filing of a saw, that the bird, long years ago, received its vernacular name from that fact. This cute little owl—one of the pygmies of the group—has the habit, during the daytime, of sitting out in plain sight and falling fast asleep. He may choose the top twig of some isolated bush in an open field, or the dead, projecting limb of a tree occupying a similar situation. His appearance on such occasions is well shown in Figure 12 of the present article. This little owl has frequently been made captive and kept as a pet; but it is the exception to have it thrive under such conditions. It seems to demand considerable exercise and the same kind of food it secures in nature.

Passing from owls to lizards, it is an interesting fact to note that, old as our country is in point of settlement, we still meet with undescribed species of animals, even in the long-settled districts. This was the case with the very beautiful little lizard here published for the first time in Figure 13. The specimen was received by the writer alive from Haines City, Florida, sent him by Mr. R. H. Young, a member of the American Forestry Association, who had secured it near his home. Several others of the same species accompanied it, both dead and

living ones, as well as others in spirits. Both sexes were represented, the males being much the handsomer, with their sides striped with jet black, and the under parts—throat and middle sides—of a brilliant blue, bordered with the same intense black.

The writer was about to describe this lizard as new, when it was discovered that one of the curators of the National Museum had a description of it up in type and about to appear. It belongs to the lizards we call "Swifts" in the vernacular, and *Sceloporus* in technical science. This one received the name of *S. u. woodi*, being named for Mr. Nelson R. Wood. Mr. Young describes it as one of the swiftest of the swift, and is captured only

with the greatest difficulty. It is a perfectly harmless little fellow, and subsists chiefly upon insects of various species.

We have a good many species and subspecies of these swifts in various parts of the United States, this being one of the smaller forms. Others are considerably larger, perhaps three or four times as large. They are perfectly harmless little creatures and are frequently kept as pets. We have no venomous lizards in our reptilian fauna, although very many people regard with distrust and sus-

picion the famous "Gila Monster" or *Heloderma*.

The interesting subject presented in Figure 14 is a very unusual one, as it was taken without disturbing a single thing shown in the picture. In the lower left-hand corner is seen the white bud of the Bindweed, and above it, slightly to the right, some flowers of the Blue Boneset. Several other plants are included—among them a withered thistle. What is most interesting, however, is the central subject, the one for which this picture was taken. This consists of three pods of the common Milkweed,



THIS IS A MOST UNUSUAL IF NOT UNIQUE PICTURE, TAKEN IN SITU, OF THE HARLEQUIN MILKWEED CATERPILLAR

Fig. 14—Drury gave the moth of this insect its scientific name, which is *Euchaetias egle*.

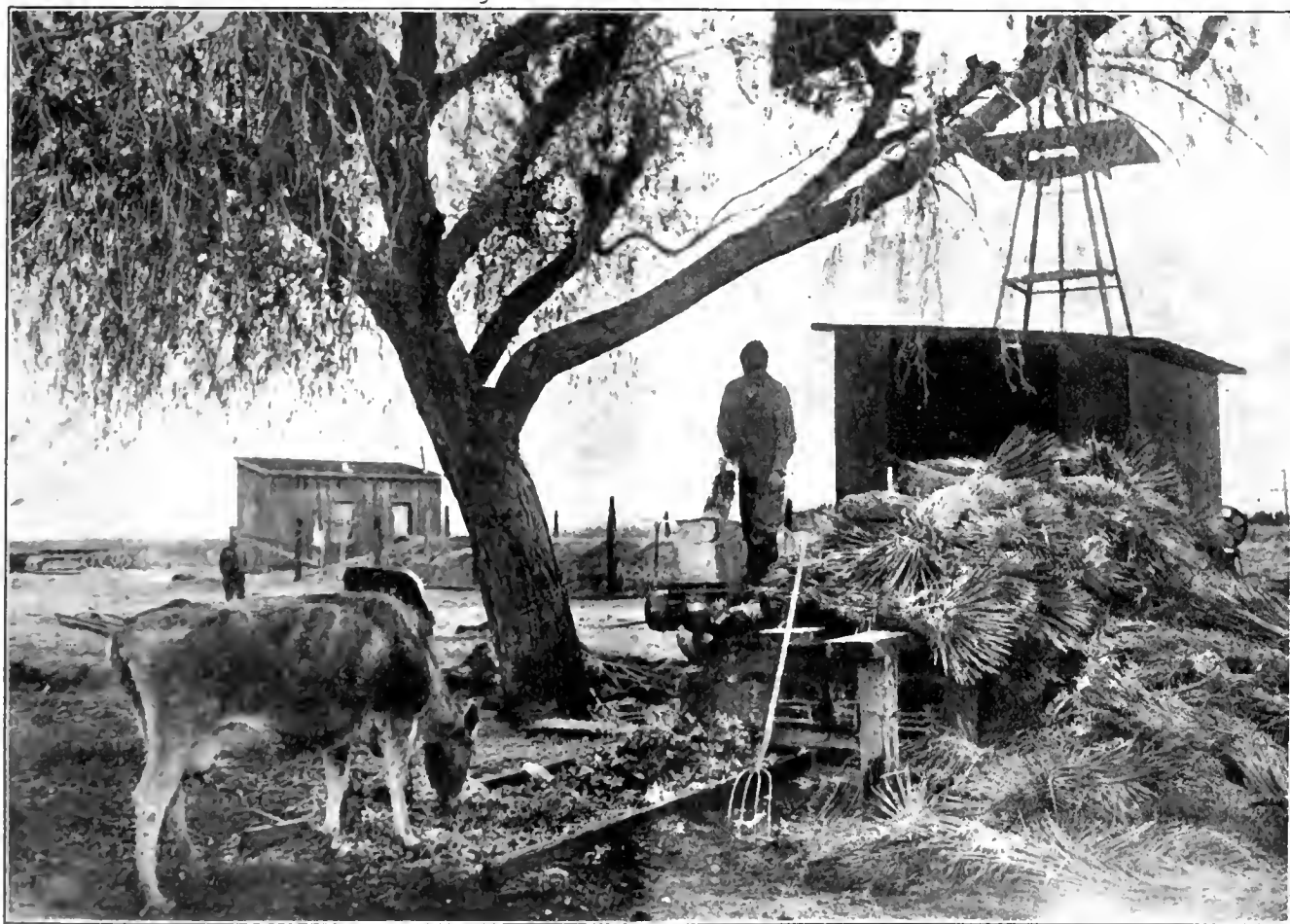
terminating the stem of one of those plants, with another pod lower down. On the central, horizontally disposed, upper pod, are six very curious-looking caterpillars; they are very hairy little creatures, the hair being regularly arranged in tufts. Where it is dark it is black, while the lighter tufts are of a buffy orange and light brown. These are the caterpillars of the Milkweed moth (*Euchaetias egle*), and they were taken natural size on a six and a half by eight and a half plate, the locality being Great Falls, southern Maryland, a few miles northwest of Washington, D. C.

This Milkweed moth is a very abundant representative of its genus, ranging throughout the Atlantic States, westward beyond the Mississippi Valley. It is a very modest-appearing little moth, with an expanse of wing measuring about four centimeters. Hampson has given us a detailed figure of it, and Holland has likewise done so in color. From the last it would appear that its wings—both pairs—are of a pale grayish brown, and there is a median row of some seven or eight fine black dots on the abdomen above. This row of dots is quite characteristic of several of the allied forms of this genus of moths.

EMERGENCY FEED FROM DESERT PLANTS

AN emergency drought-time feed for southwestern stockmen which has previously been overlooked is the desert shrub locally known as soapweed. Its scientific name is *Yucca*. While this plant is not high in nutritive value nor suitable for feed until it

meal with ground *Yucca* a fairly well balanced ration is made. By using this feed without waste in dry seasons only, a fair crop will always be available. If it is used properly and due regard given to conserving the present supply, thousands of cattle may be saved



CHOPPING AND SHREDDING YUCCA FOR CATTLE FEED

It is eagerly eaten by the cow, even though this particular milch animal was not in a starving condition, as were those which had tried to subsist solely on range vegetation.

has been properly ground, the specialists of the United States Department of Agriculture have found that in seasons of drought when range grasses and other sources of feed fail, it can be used to save cattle and sheep from starving. By the addition of a little cottonseed

during the drought season to add to the nation's meat supply.

There are a score or more species of *Yucca*. Sotol has been utilized as stock feed for some years, but only recently have soap weed and bear grass, two other forms

which grow abundantly, been utilized in this way. Both of the latter are well adapted for feed, but because the food material is found mainly in the tree-like trunk it is necessary that they be ground or chopped finely before stock can eat them.

The machines used for cutting Yucca have heavy cylinders carrying teeth or knives that rotate before a chopping block to which the plants are fed. One of the larger machines run by a 12 or 14 horsepower engine with a crew of 3 men will chop or shred about two tons of soap-weed an hour.

If fed alone, this feed may be expected to keep stock from starving; if fed with concentrates a properly balanced ration may be worked out. The customary practice among users of this feed is to give young stock six to



A TYPICAL STAND OF YUCCA, OR SOAP-WEED

This will furnish an emergency food for dry seasons when other range plants fail.

twelve pounds per day with one-half to three-fourths of a pound of cottonseed cake or meal. Mature stock are given 20 to 40 pounds and 1 to 2 pounds of the cottonseed

concentrate daily. Fifteen to 25 pounds per day fed alone will save stock from dying. Practically the only cost in using this feed is in its preparation and it is estimated that when 20 pounds is fed per day this cost amounts to only 50 cents per month.

Yucca should be regarded as an emergency feed only, the specialists say. It makes a very slow growth and only two species—soap weed and bear grass—may be expected to renew themselves if cut off. The bear grass of the New Mexico-Texas plains region will produce a new crop in three or four years, while soap weed requires from ten to fifteen years.



SAVED FROM DEATH BY STARVATION

Bunch of cattle which were saved from starvation by the feeding of Yucca, or soap-weed. Some of the stock here shown were unable to get to their feet without assistance before the Yucca was fed.

GOVERNOR LOWDEN ENDORSES TREE PLANTING

THE importance of wood as building material and the necessity for conservation of trees is recognized by Gov. Frank O. Lowden of Illinois as paramount issues in the economic life of the country. He has often urged tree planting in the state.

In a recent article in the *Chicago Tribune* Governor Lowden said:

"I know of no single acre of land in Illinois, even though it be not suited to cultivation, that cannot be made to produce trees successfully. We shall, if we are wise, make laws whereby every acre, which will not

produce wheat or corn, will be made to grow trees.

"It may be that we shall be wise enough to exempt these lands from taxation, saying to the owner: 'Plant this little tract to trees and we shall tax you nothing, requiring only that when your children or your grandchildren harvest them they shall pay a fair percentage of the proceeds into the treasury of the state.'"

"You would not only set these little acres to work for the profit of both the state and the owner, but the growing forest upon the farm will help to tie the children to the farm."

THE PLOVERS

(Family Charadriidae)

BY A. A. ALLEN

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

IF TRAVEL is an education, the plovers must be a highly educated family. With their near relatives the sandpipers, they hold, with one exception, all records for long distance flights. The one exception is the Arctic tern which nests within the Arctic circle and

winters within the Antarctic, traveling some ten thousand miles over the sea twice a year. When it comes to actually seeing the world, however, there is no bird to compete with the golden plover. This bird nests on the Arctic shores of North America and then flies south-east to Labrador, New

Brunswick and Nova Scotia. The 2,500 miles of sea between Nova Scotia and South America hold no fears for it and a direct flight is made over the Bermudas and Antilles, often without a stop. The journey is then continued through Venezuela and Brazil to the pampas of Argentine. But not content with seeing so much of the world, this inveterate tourist seeks a different route for the return journey. Starting northwest from Argentine, it crosses Central America and enters the United States by way of the Gulf of Mexico, traveling up the Mississippi Valley to Manitoba and Saskatchewan and thence to its breeding ground along the Arctic

shores. The two routes are fully 1,500 miles apart.

The western golden plovers often start from Alaska for a direct flight to the Hawaiian Islands and thence to the islands of the South Sea. The golden plovers that nest along the Arctic shores of Europe and Asia and

winter from India to South Africa, are only slightly different from the American birds and, if we include them, we may certainly claim the whole world in the range of this remarkable bird.

The golden plover is a bird somewhat smaller than a pigeon with long pointed wings. Its upper parts are spotted with golden yellow and black, and its underparts are uniformly black in summer and grayish white in winter. A white stripe from the forehead down the side of the neck and breast is conspicuous in the summer plumage when set off against the black underparts.

Very similar to the golden plover is the black-bellied plover which has a similar change of plumage with the seasons but always lacks

the golden yellow spots of the upper parts. It is equally cosmopolitan, and, in eastern North America, at least, is a more common species. Some of them pass the winter as far north as North Carolina but others continue their



WHAT ARE THE WILD WAVES SAYING?

Here's a fine place for plover and here are a couple of ringnecks and a sanderling.



BLACK-BELLIED PLOVER IN FALL PLUMAGE

They are easily distinguished from the golden plover, which they resemble, by the black spot under the wing.



ONE OF THE SMALLER PLOVER

The semipalmated or ring-necked plover is a miniature edition of the Killdeer, but it has only a single band across its breast.

flight to Brazil and Peru. Both species are similar in habits, frequenting shores and mud flats or even ploughed fields or pastures. They fly in close flocks and appear not unlike small ducks at a distance. Upon alighting they scatter to feed, running along the beach in search of stranded aquatic insects and crustaceans which they pick up with a vigorous tilt of the body as though they were about to dive.

Both the golden and black-bellied plovers are still numbered among the game birds and are hunted either by means of decoys or by stalking them along the shore. They have rich mellow whistles which are quite easily imitated and they may often be drawn down to the decoys from a great height by the hunters.

There are about seventy-five species of plovers in the world of which only eight, including the two mentioned, are found in North America. Of these, by all means the most common and best known is the killdeer, so called from its notes—"kill-dee, kill-dee, kill-dee"—which constantly fill the air wherever these birds occur. They seem to have petulant dispositions and find expression for their feelings through constant noise so that the slightest disturbance of alarm starts them off. The majority of shore-birds are confiding creatures and unless constantly shot at, will allow even the hunters to approach closely. Not so with the killdeer; it seems to have a special aversion for man and espys one approaching at a great distance and starts "kill-deeing" so as to alarm the whole flock, and long

before the other shore-birds take wing, it pitches off on a swift, erratic flight to some distant part of the shore. Its wings are long and pointed and the speed which it develops when once under way is as remarkable as the irregular course which it often pursues.

Upon its nesting grounds, and it nests from the Gulf States to British Columbia, it is even noisier than on the shores, though in the defense of its nest it often loses much of its timidity. Indeed when its nest is approached, it will usually trail its wings on the ground and go limping off within a few feet of the intruder in an endeavor to lead him away. The easiest method of finding a killdeer's nest is always to walk in the opposite direction from that in which the bird tries to lead one, noting when it seems to show the greatest distress.

Were it not for the behavior of the killdeer, the nest would be extremely difficult to find for it consists of a mere depression in the gravel or in the soil of the garden wherein are laid four very protectively colored eggs. They are large for the size of the bird, light brownish or drab in ground color, with heavy black markings, and pointed at one end so that they will fit together and be more easily covered by the incubating bird.

The young killdeers when first hatched are covered with grayish brown down and are even more protectively colored than the eggs so that when they crouch in the nest, they are almost impossible to see. The accompanying photograph of a nest containing three young and one egg will illustrate this point. They are active little creatures and can run about and even swim, shortly after hatching. At the slightest alarm, however, a note from their



THE HOME OF THE KILLDEER

Creek bottoms, pastures and cultivated lands are the nesting place of this bird. The black bands across the breast and the white neck ring break up its contour and make the bird in this photograph difficult to see.

parents tell them to crouch and they remain immovable until the old birds tell them that danger is past and that they can once more run about.

As soon as the young are able to fly, various families gather into flocks



SEEMS LARGER THAN IT REALLY IS

Because of its long wings, the killdeer appears much larger, when on the wing, than it really is.



A KILLDEER BROODING

The young birds can be seen crowding beneath the wing of the old bird.

and, if the season is dry, make for the shores and mud flats. If it is a rainy season, however, they may be found far from water until late in the fall. Some killdeers remain as far north as New Jersey for the winter but others migrate southward as far as Venezuela and Peru.

Before the passage of the Federal Migratory Bird Law, the killdeer was on the game list and their tiny bodies graced the table of many a "pot hunter." The majority



STANDING GUARD

Note how protectively colored are both the old and young killdeers in spite of their conspicuous marks.

of sportsmen, however, though attracted by their swift flight and apparent size, have always been willing, after once discovering the size of their bodies, to leave them in peace. Today all realize that their value about cultivated fields and pastures during the summer in destroying grasshoppers and other pests, more than equals their slight value as food and are glad to see them given a much deserved protection.

The remaining North American plovers are somewhat similar to the killdeer in general appearance but are

smaller. Another difference is that the killdeer has two black bands across its breast while the rest have but one. Another distinctive mark of the killdeer is the rufous patch above the tail. The conspicuous white ring around the neck is shared by all but the plain colored



HIS FIRST SWIM

Young Killdeers can run and even swim very soon after hatching and follow their parents about instead of staying in the nest.

mountain plover of the high arid plains of the West.

The best known of the remaining plovers is the semi-palmated or ring-necked plover which breeds in northern North America and spends the winter anywhere from the Gulf States to Patagonia. It seems to prefer sandy beaches to the mud flats and is common during May and again in August and September all along the coast and the shores of inland lakes. Like the killdeer it



JUST OUT

A young Killdeer only a few hours old but already far from home.

appears much larger on the wing than it really is and during the years that it was considered a game bird, even the most callous "game hogs" could not but feel a tinge of regret when they felt the tiny bodies of their

victims. It has a clear cool note of two syllables which is always given when it takes wing and further adds to its charm.

The Wilson's plover of our southern coasts is a very



NEST AND EGGS OF THE KILLDEER

The eggs are large for the size of the bird and very protectively colored. They are pointed at one end and ordinarily fit together like the segments of a pie. Here one of the eggs has been disarranged by the bird's hasty departure. The nest is a mere depression in the gravel.

similar bird but is somewhat larger. The piping plover is a much paler bird and does not have the pronounced breast band of the ring-necked species. It is nowhere a common bird but is found in summer locally from



CAN YOU SEE THEM?

Three young killdeers crowding in the nest and one unhatched egg are here shown. The young birds are even more protectively colored than the eggs and crouch at the slightest alarm and this makes them very difficult to find.

Saskatchewan to Virginia. The snowy plover of the southwestern states is an even lighter bird with just a suggestion of the breast band and face markings of the other species.

All of the plovers have long legs and relatively shorter

toes than the sandpipers with which they usually associate. Their bills are likewise much shorter and are slightly swollen at the tip being suggestive of those of pigeons with which birds, indeed, they are supposed to have much in common.

NEW YORK FORESTRY AND RECONSTRUCTION

IN AN address before the annual meeting of the New York State Forestry Association held in the Educational Building in Albany, on January 21st, Dr. Hugh P. Baker of the State College of Forestry at Syracuse, who has just returned to his work in the College after sixteen months as an officer in the regular infantry, described the effects of the war upon the forests of the world and discussed the important problem of the development of a land policy for New York and the relation of the forests to water conservation. He emphasized the fact that the period of reconstruction will be the day of the technical man, speaking as follows:

"The turning of nearly every industry in the country from the beaten path of pre-war years into war channels through which was poured unending shiploads of war supplies onto the shores of France, has demonstrated clearly the idea that the time of reconstruction in this country and the period of prosperity which seems to promise to follow reconstruction will be the day of the technical man."

In describing the effect of the war in Northern France, Dr. Baker stated that for the two years ending December, 1918, the total requirements of the Associated Governments were approximately 600 million cubic feet of saw log timber; three quarters of which by volume had to be large sized material. This tremendous demand upon the French forests had to come from a greatly decreased forest area since over 1,230,000 acres of forest land was in the territory occupied by the Germans. The loss of this acreage of forest land meant to France an annual loss of approximately 17½ million cubic feet of saw log timber. The drain upon the French forests for the past four years is estimated to be equivalent to the growth of twenty years. In other words, the growth that would have taken place in the next twenty years in the French forests has already been used. It was shown further that the forest areas of practically every other European country, excepting Russia, have been seriously depleted and that lumber for the rebuilding of the devastated portions of France and Belgium must come from America, as the disorganized condition of Russia will probably not allow that country to come into the world lumber trade for years to come.

In emphasizing the place of the forester in assisting the State of New York in solving its land and water problems, Dr. Baker emphasized the necessity of having a clear understanding of just what forestry means. As agriculture means not alone the growing of a crop of grain but the production of food and draft animals, and the manufacture of the crude products, as in the dairy industry, and finally the marketing of the product, so forestry has been as broadly defined in the 200 years of its application to European forests.

DIGEST OF OPINIONS ON FORESTRY

WILL YOU NOT CO-OPERATE WITH US BY IMPRESSING UPON THE EDITOR OF YOUR NEWSPAPER THE IMPORTANCE OF FORESTRY? WRITE TO YOUR NEWSPAPER

ONE of the most remarkable examples of service to their readers is shown by the editors of the country in their endeavor to present to the readers stories having to do with outdoor life. To the editor, perhaps stronger than any other man, comes the call of the great outdoors. And the editors in a vast majority of cases answer that call less than any other set of workers. But they have the great opportunity to present the beauties of nature and they never weary in this well doing. Columns upon columns are being printed in the various publications of the country today in regard to trees and the value of forestry as a result of the suggestion of the American Forestry Association that memorial trees be planted in honor of the men who lost their lives in the great war and in honor of those who offered their lives. The comment goes into other fields and is here condensed for the readers of the American Forestry Magazine with the request that they in turn keep the importance of forestry before their local editors. There never was such an opportunity for the members of the Association to do a great work and the editors will welcome anything you have to say of a constructive nature.

Commenting upon memorial tree planting the Milwaukee Journal says:

"It is not enough to build good roads through the country side. We should beautify them."

Then the editor goes into the possibilities and beauties of trees planted along these roads. According to the New York Evening Mail there are "Excellent possibilities for a great national work of forestation presented by a movement started by the American Forestry Association for the planting of victory oaks or victory elms to commemorate the soldiers who laid down their lives on the battlefield."

The Florida Times-Union of Jacksonville points out that Florida's prosperity depends on its rescuing of the forests far more than most persons are aware. A dispatch to the Philadelphia North American dated at Harrisburgh, by H. G. Andrews, points out the immense income that is possible through the forests of Pennsylvania. The article goes on to show those possibilities, how the chestnut trees have been killed by the blight and points to much constructive work that can be done.

The Christian Science Monitor calls attention to the fact that the Maine Legislature will take up the question of a

state forest reserve while an editorial in another number says:

"Practical forestry is being presented as a line of work to interest returned soldiers who have grown to love an outdoor life."

The importance of forestry is so great in the eyes of the editors of the Dallas Evening Journal that in an editorial they suggest that it be taught in the public schools. The Journal adds:

"The destruction of timber in the last half century has been little short of criminal. The way of the father has been foolish and their sons should be pointed the wiser way."

The Realty Magazine of New York gives the lead position to the value of tree planting in home making and uses many pictures. The Farm Journal of Philadelphia has an article by Charles P. Shoffner who writes:

"Now and then a suggestion is made that strikes thirteen. Here is one by the American Forestry Association that rings true. They say: 'let a tree be planted in memory of each fallen hero.' Could a finer tribute be paid? There is something so beautiful, so noble and so uplifting about a tree that makes it a memorial worth while."

Memorial Tree planting is a move in the right direction, says the editor of the Metropolis at Jacksonville, Fla., who goes on to say: The announcement that the Women's Clubs of Florida intend to urge the planting of trees, as memorials to brave men who entered their country's service in the world war, is a move in the right direction. It indicates a move that has everything to commend it. It is both patriotic in spirit and leading the way to a greater and more general appreciation of trees.

Trees in themselves are a thing of beauty and of utility in the Creator's design of the universe as a place fit for human habitation.

The work of the foresters in France has always been an interesting subject to the editors, and they have carried many feature stories on this work. That a Frenchman knows how to grow a tree while an American knows best how to cut it down, and turn it into lumber, is the conclusion of Captain J. K. deLoach of Atlanta, Georgia, who has been in charge of the machinery of the mills operated by the United States Army in the vicinity of Vourges, France, where the Twentieth Engineers (Forest) have been producing large proportions of the lumber used.

"Before we came into the bourgeois region," says Captain deLoach, in the Baltimore Sun,

"there were nine French mills operating, getting out a total of 10,000 feet a day. Under pressure recently, one of our American mills turned out 70,000 feet in three days. A hurry call came through for road plank to be used in the Argonne so that artillery and transport could be kept moving forward without sticking in the mud. This one mill, planned to produce 10,000 feet a day, averaged more than 22,000.

"Under normal conditions we use culls for road plank, but there was not time to select or choose in this emergency. We went through everything as it came. The planks were all five inches thick and we turned out some more than 12 inches wide as fine, clear stuff as I ever saw. War is certainly wasteful.

"The French lumbermen come close to tears as they see the speed with which we fell and cut their trees which they have carefully tended for decades. There is small chance of their adopting our methods. They say we are too fast; that it takes too long to raise a tree to cut it up so quickly.

"The American foresters have done wonderful work under difficult conditions. Away off in lonely camps they have had none of the stimulus which comes with excitement and it has been hard for them to keep going with enthusiasm at top speed. The Young Men's Christian Association has helped greatly. It establishes huts and tents out in the camps, gets supplies, entertainment, motion-pictures, reading matter, athletic supplies, writing material and even pianos to the men, makes life bearable and so keep spirits up."

A survey of the forests in Cook County, Illinois, furnished a very interesting and amusing story for the Chicago Tribune. The picture of the beauties of the woods in winter is well told and the whole story tells the trip of the Armour Club and the Prairie Club. The expedition was under the guidance of Dr. Jorgenson, director of Armour Gymnasium and the Chicago Tribune gives nearly three columns to the discoveries made by the two clubs. In these days of paper conservation it will be understood that it takes what editors call a "Corking Good Story" to get that space.

The Trenton, New Jersey, Times in an editorial says there is a special message for Trenton because of the suggestion of Dr. Frederick of the Art School, in regard to a civic center. This is to include the site of the city's new hotel and a proposed war monument. This special message means much to Trenton, the Times points out because:

"The President of the American Forestry Association and the head of the National War Garden Commission, misses no opportunity to get things planted and it will be well if people generally will follow his lead. He urges the planting of trees and the planting of gardens particularly during the coming spring and summer. There is need for united and persistent effort in both directions. Just now Mr. Pack is especially interested in the planting of trees as memorials

for the American boys who paid the supreme sacrifice in the war for democracy. He points out that in addition to being beautiful living memorials to the nation's heroic dead these trees we plant will be a thing of beauty and joy forever to those who live not only now but in the years to come and in some places it may be deemed advisable and possible to set out great forests in honor of the soldier dead."

The Times then goes on to point out what can be done with the proposed civic center if adorned with trees not only as memorials but as an artistic setting for the city plaza and any buildings that may be erected on it.

In a special dispatch to the New York World from Greensboro, North Carolina, the statement is made that:

"Unless some action is taken by the Federal Government, and that quickly, the Brevard section and with it much of the best farming and timber land in western North Carolina will be washed away by the high water during the next five years. During the last year this section has experienced three damaging floods."

According to the Houston Post:

"The Texas Forestry Association has never received the attention that organization deserves from the people of Texas. With 25,000,000 acres in woodlands, Texas has a greater interest in the present forests than has any other state. With more than that number of acres in what appears at times to be desert, Texas cannot afford to ignore the forestry problem."

The editorial goes on to say that W. Goodrich Jones, President of the Texas Forestry Association, has sent to the papers of the state letters in which he pleads with the press for the forests of Texas and the Post adds:

"The State Forestry Department deserves the intelligent support of the legislature."

A great lesson has been learned from the war, the Northwestern of Oshkosh, Wisconsin, points out in an editorial:

"More attention to Forestry."

Scientific forestry now is being taught at twenty-three universities and colleges in the country, the Northwestern says, and points to the heavy drain on lumber supplies and the fact that the coming period of reconstruction will perhaps call for even larger quantities of the raw materials furnished by the lumber industries. The Inquirer of Owensboro, Ky., comments on the offer of the American Forestry Association to help reforest France and points out the great opportunity for further cementing the cordial relations of the two countries.

The memorial tree suggestion is very pleasing to the editor of The Times at Chattanooga who says:

"It is a fine thought that we should plant trees in memory of the men who gave their lives to the nation in the great war. More and more the common sense thought of people is steering away from the notion of respect for the dead by erecting over them at home or elsewhere monuments of dead stone; structures often the very reverse of artistic or ornamental."

Chattanooga, The Times goes on to say, is subject to some extent to the "Monument Habit." The planting of memorial

trees gives a new significance to the next Arbor Day, writes the editor of the Geneva, N. Y. Times:

"There is hardly a community in America," continues the Times, "to which the suggestion is not a practical appeal."

In an editorial in The Post of Boston, the editor points out that Lynn City Council has taken action in the matter of memorial trees and says the Post:

"The beauty and fitness of these planted memorials is very apparent. Trees are always things of grace and as proposed would be growing stars of service well done. How could the memory of our heroes be better perpetuated than in a beautiful forest park?"

The Observer at Hoboken, N. J., comments on a suggestion to make community Christmas trees permanent.

Papers of Illinois are commenting generally on the suggestion for tree planting made by Governor Lowden:

"So great is the need of more trees," says the Clinton, Illinois, Public "and so manifest their benefit to future generations that society would be justified in going to great lengths in stimulating tree cultivation."

The Review of Decatur adds its indorsement to tree planting. The Hayfield, Minnesota, Herald in an editorial suggests that the planting be not attempted all in one year, but that every Arbor Day be made a memorial tree planting day. The editor of the Press at Utica points out that:

"If three or four thousand trees were planted in Utica as memorials for soldiers who wore the uniform it would be a splendid contribution to the shade, the beauty and the general attractiveness of the place."

The Dalton, Georgia, Citizen in an editorial says that:

"Out of the maze for suggestions for memorials that have followed the signing of the armistice stands apart from all others because of its simplicity and lasting qualities the suggestion for the planting of a tree for each one who made the supreme sacrifice."

The editor of the Republican of Columbus, Indiana, says the planting of memorial trees along highways is peculiarly fitting.

"It seems to make visible, says the editor, "that glorious immortality for which the soldier laid down his mortal body."

The American City in an article called "Tree Planting an Important Part of City Reconstruction Program," devotes extensive space to the possibilities of city beautifying. "A great benefit to the people of the state" is the view of W. E. Barber, chairman of the Division of Wild Life Conservation, in a letter to the Milwaukee Journal. The editor of the Lafayette, Indiana, Courier calls the planting of memorial trees a most appropriate method of supplying fitting memorials in honor of our sailors and soldiers. In commenting on the suggestion for planting memorial trees in honor of Colonel Roosevelt, the editor of the Telegram of Portland, Oregon, says:

"We venture to say there is no suggestion that would have pleased this great American better."

In the opinion of the editor of the Hammond, Ind., Times:

"Colonel Roosevelt deserves a memorial in which the entire nation can take pride" and then it goes on giving an indorsement of the suggestion of the American Forestry Association for planting trees in honor of the Ex-President.

The Manufacturer's Record carries an article from W. W. Lee, county superintendent of education, Prentiss, Miss., who urges a reforestation plan to be undertaken by the school children. Mr. Lee has a plan for organization of pine tree clubs. With pictures to illustrate an article "The Coos County Forests," The Scientific American gives the leading position to an article on the wonders of the region on the western side of the Coast Range Mountains. The Morning Press of East Stroudsburg, Pennsylvania, urges the planting of memorial trees in an editorial in which it used the poem by Joyce Kilmer.

Editors take up other subjects having to do with outdoor life. In addition to commenting on trees, and their value, the Boston Evening Transcript comments at great length on "The Bird Treaty Makes the Birds Safe." Mr. Winthrop Packard takes up the discussion of the mistatements and the conflicting views given in recent news articles on this subject, and in the introduction to his article says:

"Birds are safe so far as good laws can make them. Let not your heart be troubled."

In the Denver Post "Lord Ogilvy" has an article pointing out to the farmer why he should make a friend of Bob White.

The Times-Star of Cincinnati, has an editorial on "Man's Ingratitude to the Bird." The editor of the Times-Star points out the tremendous reproduction abilities of the insect, and shows how the world would become a desolate waste and man starved out unless the insects are checked, but says the editor:

"Between man and this state of desolation stand some natural barriers. One of these is the army of birds which feed on insects. With the destruction of the birds who stand guard over our fields and forests, a catastrophe beyond imagination to perceive would ensue. And yet man plunges blindly along the fulfillment of the grim paradox he has conceived. Every year he slays by millions the feathered friends who are his."

These short reviews, showing what the editors are ready to do in the way of co-operation, should be an inspiration to the members of the American Forestry Association and again the call is issued to each of our members to co-operate with his local editors in every way by calling their attention to forestry needs in his own locality. He will be glad to listen to you or to hear from you if you make your point clear and keep it short.

FORESTRY PURSUITS FOR DISABLED MEN

THE Federal Board for Vocational Education, which has been charged by Congress with the re-education and rehabilitation of war disabled men, has made an investigation of the subject of forestry and forestry pursuits as offering opportunities for these disabled men to train for.

A surprising amount of interest is being displayed in the subject and it bids fair to become one of the popular courses placed at the disposal of the disabled men.

This education is given at approved universities, land grant colleges and other institutions. The disabled man, if single, is given a support and allowance, or "training fund" of \$65 per month, and all his expenses of tuition, material, library and laboratory fees, are paid by the Federal Board. If he is married and lives with his wife during his period of study, he is allowed \$75 per month and \$10 per month for each child up to three.

When he has completed his course, the Employment Placement Division of the Federal Board will help him in securing a position.

There is no time limit set upon the course. The aim is solely to make a competent, thoroughly trained man out of the student.

The following extracts from the "Opportunity Monograph" on Forestry Pursuits, issued by the Federal Board, will be found of general interest.

What Forestry Is:

"Forestry is the business, or the art, or the science, depending on the point of view from which you look at it, of handling forests for timber production or stream-flow protection. It does not, as is often mistakenly thought, have anything to do with fruit trees, or even with street and park trees. The care of these comes under horticulture and arboriculture. Forestry is distinct from either in that it has to do primarily with entire stands of trees, or forests, rather than with individuals. Forests are really nothing more nor less than tree societies, or communities, comparable in many ways with human communities, every member of which has an influence upon and in turn is influenced by its neighbors; and it is this fact that gives to forestry its distinctive character.

"Forestry should also not be confused with lumbering. Lumbering has to do merely with harvesting the trees on any given area, with cutting them, transporting them to the mill, and converting them into lumber or other products. While the chief task of the forester is to manage forest lands, he has to do with the production of trees as well as with their utilization. Forestry is concerned fully as much with the future as with the present. Like agriculture it looks forward to keeping the land continuously productive by the growth of successive crops. Only in the case of forestry the crops instead of being wheat, or rye, or corn, are trees, which in turn can be converted into fuel, fence posts, telephone poles, railroad ties, wood pulp, lumber and a host of other wood products. How much the forests mean to the economic development of a community through the crops which they produce and the employment which they offer is evidenced only too plainly by the desolation which has followed destructive lumbering in many a once prosperous forest region.

"In addition to yielding crops which have a commercial value, forests in mountainous regions perform another important function which is none the less valuable because its benefits are difficult to measure in dollars and cents. By decreasing erosion and regulating stream-flow the mountain forests conserve water for domestic supplies, irrigation, power and navigation, and at the same time help to lessen the damage caused by destructive floods. So far-reaching is this influence and so great is the population affected by it, that the treatment which such forests receive becomes a matter of vital interest to the general public. One of the primary concerns of forestry is to see that forests are handled in such a way as to afford the maximum amount of protection, even if this involves, as it not infrequently does, the restriction or entire prevention of lumbering operations.

What Foresters Do.

"In order to handle to the best advantage the area under his charge there is a wide range of work which a forester may be

called upon to do. He must be able to identify different kinds of trees and must know the uses to which each can be put and the sites to which they are best adapted. He must be able to map the area and to determine the amount and value of the timber upon it. He must be able to draw up a complete plan for protecting the forest from fire and to carry out the details involved in its execution. He must know how to control the attacks of destructive insects and fungous diseases. He must be able to handle the many details connected with the collection of seed and the production of young trees in forest-tree nurseries. He must know where and how to plant these, or how to sow the seed on areas where this is preferable. He must know whether any given stand is too dense, and if so, what and how many trees should be taken out to stimulate the growth of those that are left. He must be able to determine the rate at which trees are growing and the age at which they should be cut and to make plans for harvesting them in such a way as to secure natural reproduction. And finally, he must be able to draw up a "working plan" providing in detail for the handling of the entire forest in such a way as to keep it continually productive.

"All of this obviously involves a good deal of office work in the formulation of plans, the maintenance of records, and the miscellaneous administrative work connected with any business enterprise. It also involves a good deal of practical out-of-door work. The average forester must take long walks and horseback rides. He must often camp out in a tent or with no shelter whatever. He must take his part in fighting forest fires, which means the liberal and energetic use of the ax, the mattock and the shovel. He must run compass and transit lines and make topographic maps. He must estimate the size and contents of standing trees by the use of calipers and height-measures, and must scale the fallen timber. He must mark, or blaze, the trees to be removed in lumbering and must see that the operations are carried out in accordance with the approved plans. He must collect tree cones, extract the seeds from these, sow them in the nursery, care for the young seedlings and later set them out in the forest.

"He must also do a hundred and one other things which are not strictly forestry but which are so closely connected with it that they must be handled by the forester along with his other work. Grazing is a good example of this, since most of the forest regions in the United States produce forage as well as trees. In order to utilize this to best advantage the forester must know how many stock the range will support and how they should be handled. In regions where mineral deposits occur he must be familiar with the mining laws and must have at least enough knowledge regarding mining to enable him to deal intelligently with prospectors and others. Since most of the forests occur in undeveloped regions he must know how to open these up by building ranger and lookout stations and by constructing such other permanent improvements as roads, bridges, trails and telephone lines. In short, the average forester, particularly in pioneer regions, must be a veritable jack-of-all trades.

Where Foresters Work.

"Forestry is primarily an out-of-door occupation. Some indoor work in the formulation of plans, writing of reports, handling of correspondence, and other office routine, is of course necessary, particularly in the case of those charged with the administration of large areas. But the average forester must spend the bulk of his time in the open, in the forests for which he is caring. Sometimes his headquarters may be in a small town or sometimes in a more or less isolated situation in the woods themselves. In either case his daily work will ordinarily take him into the open in sunshine and in rain. Occasionally he may be absent from home for several weeks at a time carrying his bed and provisions on his back, or, if he is fortunate, on a pack animal.

"So far as geographical location is concerned, opportunities for foresters have heretofore been mainly in the mountain regions of the West where the National Forests are located. As forestry comes to be practiced more and more on State Forests and on private lands, however, similar opportunities will develop in the East. There is no reason why large numbers of foresters should not eventually be employed wherever forests occur, and this means practically throughout the country except in the Great Plains and in the farming regions of the Central States and Middle West.

What Handicaps Are Serious.

"Generally speaking, a forester must be able-bodied and in good physical health. He must have a strong heart, sound

lungs and a constitution able to stand exposure to all kinds of wind and weather. Heart disease, tuberculosis and other serious organic troubles are handicaps that point to the choice of another occupation.

"On the other hand, there are certain disabilities, and particularly injuries of various sorts, that do not constitute any serious drawback. Injuries to the mouth, nose, ears, scalp and other parts of the head, for example, do not disqualify unless they interfere to a dangerous extent with one's eyesight or hearing. Some deafness is allowable provided it has not gone so far as to prevent communication or to endanger one from falling trees or other accidents. Even blindness in one eye is not a real handicap if the other eye is still sound. The loss of an arm or a leg incapacitates a man for the physical work required of most foresters, but minor injuries to these limbs, such as loss of a finger or a toe, do not disqualify one.

"For certain specialized duties one can have sustained even more serious injuries and still be able to give satisfactory service. One may be badly crippled and yet be successful in research work, provided he is able to move about more or less freely, has some use of his arms, and can handle a microscope. Men at fire-lookout stations need little more than good eyes and sufficient hearing to use a telephone. On the other hand, one would hardly wish to take up fire-lookout work as a permanent occupation, and unless his condition can be improved sufficiently to enable him to resume active physical work his chances for advancement are poor. Special appliances for handling tools are not necessary, as is the case with many industrial workers. The average forester must be able to turn his hand to a wide variety of activities and to use such homely implements as the ax, the hammer, the shovel and the mattock.

"The danger of further injury is no greater in forestry than in most other outdoor occupations. Accidents due to forest fires, bucking horses, falling trees and rolling stones are always possible, but the proportion of those seriously injured in such ways as these is not large. Those employed by the National Government receive compensation in case of injury incurred in line of duty.

What Training Is Necessary.

"Forestry requires the services of three more or less distinct grades of workers—the professional forester, the forest ranger, and the forest guard. The professional forester handles the larger and more technical phases of forest management. He determines what the forest under his charge contains, how much it is worth, how fast it is growing, when and how it should be cut, what kinds of trees should be favored, and other questions of the same kind; and also exercises general supervision over the execution of whatever measures are decided upon. The forest ranger acts as a sort of semi-technical assistant to the professional forester. He does not need so thorough an education as the professional forester but must have sufficient technical knowledge to enable him to carry out intelligently the plans formulated by the latter. His work is to a large extent 'practical' and involves the routine of fire protection and fire fighting, marking the trees to be removed in timber sales, scaling the felled logs, handling planting operations, surveying, building trails, running telephone lines, and doing other work connected with the administration of the forest. The forest guard is ordinarily a non-technical assistant who helps the forest ranger in those aspects of his work which require little or no knowledge of forestry. Forest guards are frequently appointed for short periods only to help the regular force during the busy season, and particularly in the work of fire protection and fire fighting. Previous experience in the woods or in similar occupations such as lumbering and surveying constitutes a valuable, but not essential, preliminary training for foresters of all grades.

"Twenty-five years ago the professional forester was almost unknown in this country and there was not a single educational institution at which he could secure the necessary training. Today the profession is well recognized and there are more than 20 schools offering instruction of a grade similar to that required of civil engineers, doctors, lawyers, ministers and other professional men. As a basis for the more technical phases of his education the man who desires to become a professional forester must have had courses of collegiate grade in botany, geology, organic chemistry, mathematics through trigonometry, plane surveying, mechanical drawing, economics, and either French or German, or preferably both. With these as a foundation he is ready to go ahead with the technical subjects such as dendrology, silvics, silviculture, forest mensuration, forest valuation, forest management and forest regulation. Obviously a comprehensive training of this sort cannot be obtained with less than four years of collegiate work, at least two of which must be devoted almost entirely to professional forestry subjects. If a man has already had a college education, however, he can readily prepare himself for the profession by two years of post-graduate work. The degree of bachelor of

science in forestry is usually given on the completion of a four-year professional course, and of master of science in forestry, or master of forestry, on the completion of a five-year professional course or of two years of post-graduate work following four years of regular college work.

"For the forest ranger no such intensive training is necessary. With a high school education as a background, one year of rather elementary training in such subjects as fire protection, surveying, timber estimating and scaling, nursery practice, methods of planting, range management and report writing is sufficient to enable a man to qualify.

"In general, the course covers much the same ground as that taken by the professional forester, but in a much briefer and more elementary way. Those who have already had considerable practical experience along these lines can secure a sufficient foundation for their work in three or four months, although even for such men the longer course is preferable if time to take it can be found. Many of the forest schools of the country now offer courses of this sort and the opportunities for instruction are ample.

"Since forest guards are engaged almost wholly on non-technical work no particular course of training is necessary. No one with any ambition, however, would wish to remain a forest guard indefinitely when other opportunities are open to him merely by taking a free course of instruction. If one wishes to take up forestry, therefore, and is not in a position to take the professional course, he should by all means attempt to qualify as a forest ranger. Should lack of other openings then make it necessary for him to serve as a forest guard for the time being, he would be in a position to take advantage of the first opportunity for advancement.

What Opportunities Are Offered.

"Opportunities for employment for foresters may be classed as fairly good. The point has now been passed where the supply is totally inadequate to meet the demand, but at the same time the war has greatly depleted the ranks of foresters throughout the country, and there is no question that many new men will be needed during the process of reconstruction and afterwards. The National Forests already offer opportunities for the employment of many men and it cannot be doubted that similar opportunities will soon be offered in State forests as well as in the case of forests still in the hands of private owners. With the steady decrease in the timber supply, the Nation will soon be face to face with the necessity of practicing forestry extensively as a national safeguard and unless private owners take upon themselves the task, there is little question but that the Federal and State Governments will take matters largely into their own hands.

"Altogether it is a safe prediction that any one who desires to engage in forestry and who qualifies himself for the work will be able to find employment. The entering salary for forest guards in the national service averages about \$900 a year and for forest rangers about \$1,100 a year. Technically trained foresters ordinarily enter at approximately the same salary as forest rangers, \$1,100 or \$1,200 a year, but with greater opportunities for advancement later. In State and private work approximately the same entering salaries may be expected although some private owners may be unwilling to pay quite so much to forest guards and forest rangers at the start.

What Are The Chances For Promotion.

"Chances for limited promotion are reasonably good. It should be recognized frankly, however, that one can not hope to get rich in the profession and that a comfortable living is all that can ordinarily be looked forward to. In exceptional cases unusually able and well qualified men will doubtless be able to draw salaries of \$4,000 and \$5,000 a year. The average professional forester, however, can hardly hope to advance much beyond \$2,500 or \$3,500 a year except by acquiring an interest in some lumber business or in the forest itself. For the forest ranger a salary of \$1,500 or \$1,600 may reasonably be looked forward to. Moreover, this salary often carries with it a ranger station which can be occupied as long as he stays in the service, and also an opportunity to produce some crops for his own use. Forest guards can hardly hope for more than \$900 or \$1,000 a year.

"In other words, in forestry, as in all other professions, the better educated you are the better are your chances for promotion. Even at best, however, the chances for large salaries are small and those who are bent on getting rich should look elsewhere for an opportunity to do so. On the other hand, one who is satisfied to make a comfortable living, to spend a large part of his life in the open, to occupy a responsible and respected place in his home community, and to enjoy the satisfaction which comes from having an important share in a work of great public service, cannot look for a more congenial or attractive occupation than forestry."

LETTER FROM CHAPLAIN WILLIAMS OF THE FORESTRY UNITS

MR. P. S. RIDSDALE, Treasurer of the Welfare Fund for Lumbermen and Foresters in War Service, has received a very interesting letter and report from Chaplain Howard Y. Williams, formerly of the Tenth Engineers (Forest). Chaplain Williams has recently been designated Senior Chaplain of the Forestry Units, with headquarters at Tours. In writing to Mr. Ridsdale, he said: "Your Fund has been a blessing." His letter and report are both reproduced here because they are full of interest, despite the cessation of hostilities.

DIVISION OF FORESTRY
OFFICE OF THE SENIOR CHAPLAIN
A. P. O. 717, FRANCE

November 27, 1918.

DEAR FRIENDS:

Have just come back to Tours after a two weeks' trip of inspection and unlike so many previous times, now that the censorship is reduced I can tell you all about it. Among the 30,000 soldiers that I am father for, we have had a large number with the First and Second Armies at the front. With the armistice on and the changes resulting I had to go over our field there to reassign chaplains, etc. I left for Paris the second day after the armistice was signed and so got in for a half day of their celebration. Unless you have been here for a year, like I have, you cannot imagine the change that has taken place in the appearance and spirit of the people. It is wonderful, the new sunshine that has shed itself everywhere. Even the cities themselves show the change, with their flags, arches, etc., but most of all the lights on the streets in the evenings. I have stumbled all over myself and others in the streets of Paris on the dark nights that have passed, but never again. The whole place is ablaze, and all the other cities and towns have followed suit. Parades were everywhere, but the funniest of all were those French girls who would march down the streets, a number of them arm in arm. Spying some Americans they would circle around them and repeat, "Do your duty!" "Do your duty!" This meant that we must kiss them all. Well, that was some celebration.

The next day found me at Chaumont, where we have our General Headquarters, and where a branch of my section is located. After a day there of consultation and plans I was on my way in a big Sunbeam auto and with a good chauffeur to the stamping grounds of the two armies. All the way along the road were thousands of troops marching to and from the old battle front. Many were coming back for rest, but other regiments of infantry, cavalry, and artillery were on their way to Germany. The roads were thick with the battle-scarred French on their way to Metz. As you can well imagine the expression of the faces were very different from those I have seen when men were marching to the trenches. Another sight pitiful and yet joyful was the hundreds of prisoners returning from Germany. As you know they were just free and had to shift for themselves. They wore everything imaginable, and carrying all sorts of boxes and packs they made a strange sight meandering along singly sometimes, and then by twos and threes, and crowds. They were directed to great stockades, once used for German prisoners. There every man had to take a bath and go through the louse exterminator. Afterwards they were fitted out by the American Quartermaster with what was lacking in their needs, and then they jogged on their way again, until finally they should hit the railroad. They were now even an odder looking sight for old French, British, and German uniforms were added to by American. A man would have an American hat and blanket topping off an old French uniform, or perhaps instead of the hat khaki breeches used between French blue leggings and a French coat. It was some sight, but they were happy and that was sufficient. Most of the Americans had only been there a short time and it had been a lark to them. After the first few months few Americans had been taken. The men had fought until the last, and never gave in.

Thus I went through Toul, over to Nancy, then by the remains of St. Mihiel, Verdun, etc. I visited my men still living in their dug-outs in what was once No Man's Land. I had taken some phonographs along and new records from friends in the States. It did seem odd to hear the music being played when outside all was torn to pieces, woods were shattered, only stumps remaining, barb wire stretches everywhere

until one would think there had never been so much in all the world. We have had several groups of engineers working in the Argonne Forest, where the Americans did their best and hardest fighting. It almost seemed sacred ground when I thought of the price that had been paid to gain it. Where before the shells flew and raged, now all was quiet. Our companies are all through and right up to the Hindenburg line and beyond to where the last days found us. We leisurely strolled through German trenches which they had thought were secure forever. Made of concrete, the officers had pool tables, baths, and then chicken and rabbit coops for the means of dainty needs. How we fooled them. When one sees the damage that German shells did to us, he wonders how more could be done, but when one goes over that Hindenburg line and on to see what we did to them he sees that more. The land in these quiet days looks as though tornadoes and earthquakes had tossed and rocked her to the utmost. Towns have not a wall left standing. Trees are cut and stand only in shreds. Here and there are those machine gun nests which took such deadly toll. You hardly notice them as they lie covered under little mounds of grass, but careful observation reveals the slit in the concrete through which they pour their deadly hail. One near St. Mihiel was the worst I have seen. It was at a cross-corner and covered three roads. It looked like an innocent mound decorating the street corner, but a close-up view showed the opening which covered the surrounding country. We leisurely visited the trenches and picked up enough souvenirs to start a small war of our own, guns, shells, German helmets, pieces of barb wire, etc. Will have plenty to show you when I return.

Many are the friends that I have renewed acquaintance with again on this trip. My heart always beat a little faster when I ran across men from my old regiment, the Tenth Engineers, who have been promoted and commissioned and are doing work with other units. I sort of feel as though we were brothers. Then I saw Croyle and Davis of my days at Union, and Heinzman of the days at Iowa. So it was wherever I went, I ran into some of the friends of by-gone days. Then on Sunday last I arranged to spend the day with one of my old companies. I had three meetings and it was some re-union. My regiment is going back sometime in late December. How I should like to go with them. I telegraphed to G. H. of my desires but also of my willingness to remain if they thought it for the best interests of these engineers who look to me as their senior chaplain. The word came back, "You should remain," and so for two or three months or longer I shall continue on the job here. I now have sixteen chaplains assisting me, but expect to have twenty-five soon. The men who are going home are of course delighted, and the men who must stay are down-cast. Of course we would all like to come home, but there is work still to be done here, and as I am well acquainted with the field I am ready to stay and do my best, always looking, however, for the day when I shall be off for Hoboken and home.

Thanksgiving has passed and Christmas will soon be here. Surely we had more to be thankful for than we dreamed even a month before. We are proud of you at home and the splendid way in which you have backed us up. Am sure that you have found joy in service well done, even as we here have done. My heartiest wishes for the Merriest Christmas and a New Year resplendent in opportunities of service in the spirit of Christ, our Saviour.

Faithfully your friend,

HOWARD Y. WILLIAMS, Senior Chaplain, U. S. A.

To keep up our pep it has been my purpose to publish once a month such a news sheet as the following. Our immediate departure makes our first effort the last. G. H. has asked me to remain here in my capacity as Senior Chaplain for Forestry Units, and so I shall not be with you on the return trip, much as I should like to be. In spirit I shall be with you.

May our Heavenly Father bless you all richly as you go back to civil life. I shall hope to see you all in later days, and shall always be glad to hear from you at 3326 Oakland Avenue, Minneapolis, Minnesota. Just remember that I am ready at any time to marry you to that "best girl in the U. S. A."

I shall always count my experiences with you as very precious. Good-bye! God-speed!

HOWARD Y. WILLIAMS, Senior Chaplain, Forestry Units.

OLD 10TH ENGINEERS HOBOKEN SHEET

Headquarters Detachment of the Old 10th Engineers, Tours.

Captain F. C. Barlow is in charge of a detachment of men constructing a mill at La Chaise Dieu.

C. J. Clifford and Donald R. Broxon have been commissioned second lieutenants. They are with cordwood operations at Chamfont.

Regimental Supply Sergeant Wm. H. Icenogle has been commissioned and is in the Section Forestry Office at Bourcaux.

James A. White, our former regimental supply sergeant, is now a second lieutenant in the Forestry Section at Gievres.

Chaplain Howard Y. Williams is designated Senior Chaplain of Forestry Units with headquarters at Tours. He now has fifteen chaplains assisting him.

Former Regimental Sergeant-Major Henry T. Miller is now the regimental sergeant-major for the Casual Detachment at Blois.

Second Lieutenant George Walker is in charge of conveying trains. His headquarters is in Gievres.

Guy C. Hendrickson, regimental sergeant-major, has received his commission. Ed. Badertscher is regimental sergeant-major in the new organization.

Sergeant Mark A. Scharp has been employed for several months in the office of the American Delegate, C. I. B. G., Paris.

Byron DeYoung, former chauffeur for Colonel Woodruff, has been promoted to the grade of sergeant in the 20th Engineers. He is now driving for Major-General Harbord, the present Commanding General of the S. O. S.

Cook Ed Redford has charge of the Depot Engineers' mess at Gievres.

Alfred C. Christeson was promoted to the grade of color sergeant. He is attached to the D. C. and F.

Glen D. Watkins and Jimmie Carron are keeping an eagle eye on the mail directed to the men of the old 10th Engineers. If you are called away on detached service, drop the boys a line and they will do their best to insure you rapid mail service. Watkins has been promoted to wagoner, and Carron has been promoted to sergeant.

Tom Morrison was recently transferred from the first battalion and is now with the D. C. and F., at Tours.

Headquarters, First Battalion, 10th Engineers, Pontenx (Landes).

In the first place we are all very much cast down over our loss of Captain Condon, one of the best adjutants our District ever boasted, and believe me the section that gets him will have our envy. Since Major (now Lieutenant-Colonel) Benedict's departure one doesn't know what to expect next.

Our Sergeants, Billingslea, Kellogg, O'Malley, Calloway, Cook, Hughes, Henry, Corse and Berge, of old Co. C, Co. D, Co. A, 41st Engineers, and 503rd Engineers, respectively, are now nine very dignified shave tails of the 32nd, 33rd, 34th, 41st and 4th Engineer Service Co., 20th Engineers. They are hitting the ball in great fashion too, and have all the men behind them.

Our fine old Paymaster Clayton B. Griswold, Co. D, died recently of pneumonia, and his passing is one of the first of a series of deaths resulting from the "flu." Sergeants Pierce and Warren, of the 32nd Co. Det. are the latest, and we hope, the last cases.

It has been rumored that Sergeant-Major Ryerson, who recently took his examination for a commission, has wavered somewhat in his determination to support the gold bars. The way they treat those second looies at Tours, he says, is "simply scandalous," and maybe he'd better keep his present position where he at least can make all the officers in the district toe the mark for officers' call once a week. If a sergeant-major doesn't command respect, who does?

Sergeant Thomas F. Mahon (Mange—alias Scurvy) has been appointed cop at a nearby junction. He's our only Irish cop, but amply makes up for the lack of his brethren on the police force. Recently he saved the appearance of an outspoken but small Navy man who visited the district. This little tar saw a big darkey coming back from leave and said: "Gee, look at that big coon over there!" Sambo turned around and said: "Look out, Boss, you'se ovah heah now—don't call me no coon." Mange stopped difficulties by stepping up and saying: "Now, lads, no fussing on my beat."

We had a big wreck on the beach nearby. A large vessel carrying Oporto and Malaga wine was torpedoed just opposite headquarters of the 4th Battalion and several thousand barrels of liquid joy came ashore. It's all gone now, but while it lasted—"Golly how they did enjoy it." Some claim it was Hun propaganda. Be that as it may, it caused a lot of gaiety to the French and Americans of this section, and is giving several hundred lawyers a living once more.

The Hot Springs Special at Bonricos is com-

plaining of a diminished attendance since the Summary Courts have been stricter. Sergeant Bugler Schillemoore is also kicking because the patronage at his hotel is "very transient now-a-days."

Co. C, now 31th Co., broke the production record last month by knocking off a hundred thousand feet in 20 hours, which is going some, considering the average size of the logs were not over twelve inches.

Hope you can glean a little news from this mess. Best of luck to you on your news sheet. We have all wanted something like that for a long time, but have not had a progressive leader to start it. It will be the only identity of the old 10th now.

If I can be of service in the future—let me know—parceque je le fera avec tous mon coeur.

Headquarters, 2nd Battalion, 10th Engineers, Besancon (Doubs).

Private Glen D. Watkins, lately of 3rd Detachment fame, was sent to Tours to assume complete charge of the mails and to investigate the cause of non-receipt of mail from the States by these headquarters. Evidently he has been successful as we have received no mail since.

Marion William Belknap, self-styled second-story-man, is now posing in the most prominent photograph shop in this district as "AMERICA'S ANSWER TO THE HUN." The girls want to know when he became a soldier.

The 37th Co. (formerly F Co.), in honor of their big cut, 93,000 in ten hours, gave a banquet, but the headquarters detachment was forced to decline the invitation which, by the way, was not given, in view of the fact that napkins were not available.

Taken out of a laboring battalion, given a berth in a real engineering outfit, and soon after promoted to the rank of corporal; such is the history which reads more like fiction, of the army life of erstwhile Private, First-Class, Roy C. Dougherty (good pay, travel and promotion).

Our representative from the East-Side, Sergeant Thomas Jeremiah O'Connor, the boy with the typewriter neck because it is underwood, is a valuable acquisition to our District Y. M. C. A.

Private Schaner, of heavy work fame, straight from the farm to the lure of the bright light way, is being used as the detachment decoy.

Steeplejack Nick Oliver, is too well known to need introduction. Suffice it to be said that in his illustrious person we boast of one of the best stationary engineers in all respects that has ever ornamented a chair with his person. (See Service Record.)

It is reported that our erstwhile Battalion Sergeant Noel A. Dew, has been transferred to the Camouflage Corps. Very appropriate.

Sergeant Edward L. Ludwig, well known architect from Minneapolis, late of the 43rd Engineers (road builders), is a valuable acquisition to this office. Summing up all of his various talents, he is one of the best eaters that we have ever met.

Johnny Rule, a young but brilliant traveling auditor, better known as "Handsome" by the smart set; who once wrote to his home paper in SISSON (where have I heard that name before) that he would stand by OLD GLORY to the last, has just been classified as "Z-4" as a result of shell shock. Who threw the peanut?

Leo A. Millett, who "Thinks he should have joined the infantry," is at present engaged in chasing wagons up and down the P. L. M. in search of one.

Wanted: A man to act as model for fitting of Sam Browne belts, boots and spurs (to keep their feet from slipping off desks) for newly created officers.

Murrell C. Warren, better known to the elite of this community as "Kancy La'our," has just recovered from an attack of heart failure.

One of our soldiers recently passing through Tours from the front reports grand concerts at headquarters. Who invented work?

It is with deep and genuine regret that we have to report the loss of one enlisted man, Battalion Sergeant-Major Walter Charles Lowdermilk. It is indeed more than a pleasure, it is our duty, to salute Lieutenant Walter Charles Lowdermilk.

Comply with requests from headquarters, and let your folks at home know all about your doings. Use field service post cards and save paper.

Battalion Supply Sergeant Lloyd Phillip Emerick, B. S. S., reiterates that he is an American citizen, even though a native son. Long live California!

Erstwhile Private Premier Class Viscount Edmund Francis DeBaroncelli, until a few days ago our only corporal, has decided to become an American citizen, and has filed naturalization papers. We knew he would get right.

3rd Detachment, 10th Engineers, Sore (Landes).

Our camp during the past three weeks has been hard hit by the malady known as "Spanish Flu," otherwise "Spanish Influenza," and it is with sorrow that I have to report the death of two of our boys. Corporal Clyde A. Warren died on October 23rd, and Sergeant James A. Pierce died on October 29th, diagnosis in each case being pneumonia brought on by the "Flu." Both of our departed comrades were original members of the Co. "A" since the regiment was organized at Washington, D. C., and their loss is keenly felt by all.

Our Acting Top Sergeant, Gerald D. Cook, better known as "Jerry" Cook, is now wearing a gold bar on his shoulder, having been recently commissioned a second lieutenant, and all the boys wish him the best of luck now that he is "among the commission." We all feel that we have three of the best officers in the whole regiment now in Lieutenants R. T. Allen, C. W. Chittenden and G. D. Cook, and are willing to go upon record as having said so.

Supply Sergeant Paul E. Colter is now on the job as "Acting Top," and is handling it like a veteran.

The following promotions have recently been made in the Detachment:

Emery L. DeRushia, sergeant from private; Ralph Elder, sergeant from corporal; Glen S. Harding, sergeant from corporal; Loren H. Balbraith, corporal from private; Thomas F. Johnson, corporal from private; Joseph A. Lanum, wagoner from private; Harry R. Suita, wagoner from private; Ralph E. Bacon, cook from private; Roger W. Billings, cook from private.

The Detachment as a whole would like to take this opportunity to thank Lieutenant Weiss, Medical Corps, U. S. Army, for his untiring efforts, both day and night, in ridding this camp of its epidemic of "Spanish Flu." We feel certain that if it was not for Lieutenant Weiss' constant attention to those of us that fell victim to this disease our losses would have been far more severe than they were.

Co. B, 10th Engineers, Pontenx (Landes).

Sergeant C. B. Griswold, Co. B, 10th Engineers, but lately with Disbursing Officer, Q. M. C., at Bordeaux, died after a short illness at Base Hospital No. 6 from pneumonia.

Griswold left the states with Headquarters Co. as a private, but was assigned to Co. B, shortly after arriving in France. Through his untiring efforts and experience along clerical lines he was made supply sergeant, and at the same time was put in charge of all the clerical work connected with the company. When the company was divided into three camps, he still retained his old duties, but on top of this was made Acting Top. For sometime he was on detached service for one week out of each month with the Disbursing Officer. Three weeks before his death he was on detached service awaiting his transfer to the Q. M. C., and it was at this time that the end came. He died October 22nd, leaving a wife, mother and father, beside a great number of friends in the 1st Battalion to mourn his death. This was the first and only death in the company since it was organized.

In anticipation of winter, the tents at Aureilhan Camp have been replaced by slab houses. A new barber shop has been built recently, and a shower bath and laundry are now being constructed.

Corporal Ernest C. Peachey is on detached service with Captain E. C. Barlow, erecting small mills in Northern France.

Corporal Erwin C. Hyde is also on detached service. He is erecting a stationary steam engine at Abainville (Meuse).

Private George O. Stewart received his commission as second lieutenant October 23rd. Lieutenant Stewart, previous to obtaining his commission, was surveying and estimating timber under Captain Berry.

Private Grover H. Lazarus has returned from the hospital at Pontenx where he has been confined for several weeks as a result of an accident at the mill.

Private Thomas Lommasson is on detached service with the 17th Engineering Detachment at Camp Gron, St. Sulpice. He is engaged in dock construction work.

Corporal Kelly O. Reynolds is on detached service with Major Benedict, the Section Forestry Officer.

Captain Inman F. Eldredge is now adjutant for the 11th Battalion, 20th Engineers. Lieutenant R. T. Allen succeeds Captain Eldredge as Commander of the 33rd Company.

Second Lieutenant Edgar Myers has recently been commissioned, after completing the course at the Saumur Artillery School.

Lieutenant Sanford, who has been in command of Courant Camp, has been transferred and is now captain of a Sapper Company in the States.

Sergeant J. V. C. Williams formerly of B Co., 10th Engineers, is now with the Tank Corps, First Tank Center.

Sergeant George A. Callaway was commissioned second lieutenant, October 8th, and is assigned for duty at Aureilhan Camp.

Sergeant Robert S. Henry succeeds Lieutenant Callaway as Sergeant in charge of the mill operations at Aureilhan.

Lieutenant Charles T. Kraebel, formerly sergeant in Co. B, later with "The Stars and Stripes," is now with Captain Swift Berry on reconnaissance work.

Lieutenant W. F. Ramsdell formerly sergeant with Co. B, is at present stationed at Headquarters, 2nd Dist. Depot Division, 1st Corps.

Sergeant Glenn C. Fullenwider, who has had charge of part of the woods operations at Courant River Camp, left for Haute Marne on November 5th. He is now a student in the Engineer Officers' Training School.

Courant River Camp is now operating a steam skidder to skid logs from the wood to the river.

Owing to the extremely low water in the river we have experienced a good deal of difficulty in logging the Aureilhan mill. Conditions have improved somewhat with the recent rains.

The following promotions were made in the company November 7, 1918:

Huge V. Badertscher, from sergeant to first sergeant; Oliver M. Sayre, from corporal to sergeant; Fred M. Reed, from wagoner to sergeant; Carl W. Labhart, from private first-class to sergeant; Samuel A. Brasher, from lance corporal to corporal; Chas. W. Cook, from private first-class to corporal; Ray O. Pattison, from private first-class to corporal; Mathias B. Stonestreet, from private first-class to corporal; Robert K. McClelland, from private to corporal.

Co. C, 10th Engineers, Pontenx (Landes).

We received the news yesterday that the Armistice had been signed and of course the French people here just went wild, the same as every other place in France. They burned the Kaiser in effigy in Pontenx and had a big lantern parade. The thing that makes me sore is that they did not allow the mills to shut down and give the men a chance to celebrate. One of our men stole the big nut off of the saw mandrel, and we had to shut down until we found it. It certainly was a kid trick, but it gave the night crew time to celebrate.

We broke all records last month, and also won the cut in September. We cut 99,050 feet one day last month, and nearly 1,800,000 feet for the month. The spirit has been better in the last three months than I have ever seen it. The men have certainly done great work. They are tackling everything as though they were playing a long game of football. There is a great deal of rivalry between the woods crew and the mill crew, and also between one outfit and the other mills.

1st Detachment, 10th Engineers, Donzy (Nievre).

At the end of August, the 1st Detachment completed the Mortuier Operation near Gien, in so far as available saw logs were concerned, and moved overland, a distance of some 80 kilometres, to the new operation near Ciez-Couloutre. The dismantling of the mill, moving of camp, mill and equipment overland and the setting up of the new camp and mill at Ciez-Couloutre was accomplished in one week—which was pretty quick work. The new operation consists entirely of oak, running to fairly good sized stock, with large quantities of coppice, now being cut by quartermaster and artillery troops.

Captain Benedict left this station the latter part of September to assume command of old Co. D of the 10th, and First Lieutenant T. H. Hughes of the 13th Co., 20th Engineers was assigned as Commanding Officer. Lieutenant Hughes has since been appointed captain.

Second Lieutenant W. R. Brown has been appointed first lieutenant and is still in charge of the mill and shipping end of this operation.

Wagoners Frank H. McAleer, Reuben P. Miller, George M. Isinger and Sergeant Michael E. Borheady were transferred to the Motor Transport Corps as motor drivers the latter part of August and we have since heard that they were driving trucks in the midst of the "Big Push" at St. Mihiel. McAleer returned on a short leave and told some very interesting tales of his experiences at and near the front.

Corporal Fred H. Miller has been transferred to the Army Candidates School.

The following is a list of recent promotions in the 1st Detachment:

Earl Weaver has been appointed sergeant. Edd Harrison has been appointed corporal. The following were appointed wagoners: Thomas A. Clark, James W. Yates, Leroy T. Rickey, Carl E. Speaks.

Co. E, 10th Engineers, St. Julien (Cote d'Or). Promotions

Lieutenant Haworth from second to first lieutenant.

Lieutenant Herrick, from second to first lieutenant.

Sergeant Grant attended training school and received a commission as second lieutenant in the engineers.

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WOODEN SHIPS

RETIRING from his post as manager of the Federal Shipping Board's wood-ship division, Mr. James O. Heyworth declared that the construction of these vessels has been justified by the valuable service they have rendered "in both coast-wise and transoceanic runs." Of one hundred and one wooden ships completed and delivered to the Shipping Board up to December 1st, last, he reports ninety-four now in active service. Eighty-five of these, according to the records now in hand, "have made in all 305 voyages, covering a total of 490,422 statute miles." Wooden ships brought last year's Hawaiian sugar crop to the States. They plied from San Francisco to Manila, from Pacific coast ports "to Africa and Antofagasta, Chile; from Antofagasta to gulf and Atlantic ports; from gulf ports to Atlantic ports," and thence "to Halifax, Bermuda and the Virgin Islands." They carried canned goods, cement, nitrates, coal, sulphur, general cargo, "serving their purpose by releasing from essential trades," in waters outside the war zones, "vessels that could meet the requirements war zone conditions imposed."

Admitting that the "hopes of the proponents of wooden ships as to speed of construction were overly sanguine," Mr. Heyworth says, nevertheless, that, "measured by performance, the entire wood shipbuilding program has shown an efficiency of over seventy-two per cent," which compares very favorably, to put it in the mildest terms possible with the efficiency shown by, for instance, the "fabricated shipbuilding program." And he expresses the belief that the wooden ships will continue in peace time "to serve a useful and profitable purpose." Their carrying capacity and steaming radius may be increased, he suggests, by the use of fuel oil instead of coal. "Such opposition as has arisen among operators to the wood ship is based," he explains, "not so much upon the material of which it is constructed as it is upon its size and consequently small carrying capacity." The fuel oil suggestion is evidently presented to meet that objection.

WILLOW FOR ARTIFICIAL LIMBS

THE Forest Products Laboratory at Madison, Wisconsin, is working on the drying of willow for artificial limbs. There is a shortage of material and the demand for artificial limbs will increase. It takes from three to five years to air-season the stock, but indications are that it can be done in kilns in from 60 to 70 days.

PLANT MEMORIAL TREES FOR OUR SOLDIERS AND SAILORS

Broxon has been made a second lieutenant in the fuelwood work. Sergeant Jones is now first sergeant. The following are our new sergeants: Manning, Hawke, Bradford, McClosky, Bal-singer and Bert Reed. Backus (known as Goldie), one time cook, is now a corporal in charge of the railroad construction. In October I understood that our operation set a record cut in hardwood, 20 M' mill class, for France. We have a fine camp here, also the beginning of a band.

Co. F, 10th Engineers, Levler (Doubt)
The 37th Co. formerly Co. F, established a new record for mills of the Forestry Regiments on October 30, 1918, by cutting 163,000 board feet of lumber in two ten-hour shifts. The mill has a rated capacity for two shifts of only 40,000 board feet.

The newest thing in non-coms are Sergeants Alexander, Muzzall and John J. Poitevin, and Corporals, Rene H. Meroux and James O. Hutchings.

Private Ward G. Rush returned to familiar scenes October 29th after having spent eleven months in various hospitals in France receiving treatment for ear trouble. He was as glad to return as we were to see him.

Captain Fred Morrison treated the men of his command to a most sumptuous feed on Sunday, November 3rd, in celebration of the record cut made by the sawmill recently. Uncle Sam will have to go some Thanksgiving Day to equal it in variety, quantity and appreciation.

An item of unusual interest occurred November 2nd—some first-class mail arrived. It seems that Turkey knew she couldn't last longer than Thanksgiving Day, so she capitulated while the capitulating was good.

Master Engineer, Senior Grade, Parrish and Sergeant, First-Class, Adams are wearing Sam Brownes, having received commissions in the Engineer Corps recently. We bucks are all glad to salute them.

Lieutenant Adams received his commission while in the Camp Infirmary with the mumps. Don't tell the rank and file he wasn't "swelled up" over it. Well, it's the kind of inflation that isn't permanent.

First Lieutenant Yandell Y. Miller has been assigned to this command as Camp Surgeon. We have learned to know and like him.—The regulation O. D. Pills never were better.

We are glad to see Major McKay again. He returned recently from A. P. O. 714 where he was attending the Sanitary School.

Ex-Corporal Charles M. Rose, Chef de Gare of D'Yoche, has been appointed a sergeant. **No Reports Received From Companies A and D**

TRAGEDY OF FRENCH TREES

BBROKEN homes, ruined factories, shattered churches, violated graves, it had seemed to me we had rung all the changes on the destruction of war. But there remained one—the tragedy of the trees—says a writer in McClure's Magazine. You can rebuild houses, churches, towns even—for that takes only money. But you can't rebuild orchards of fruit trees and avenues of great shade trees—for that takes time. We were seeing them everywhere now—orchards with trees that were but faded, shriveled branches of brown leaves lying on their sides; orchards, where these had been cleared away that showed nothing but white-topped stumps. They say that when the warm spring came, some of these orchard trees, lying on their sides but not wholly severed, leafed gently and then—just before they died—bloomed once again for France.

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CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

DURING the month of December Messrs. Clyde Leavitt, Robson Black and Ellwood Wilson, went to Halifax, Nova Scotia, to attend a conference of prominent lumberman and the Hon. O. T. Daniels, Attorney-General and Minister of Lands, to try and get a forest service established in that Province. Nova Scotia is now the only Province without such a service, forest lands in the prairie provinces being administered by the Dominion Forest Service. While Nova Scotia has very little left of her Crown Lands, the lumber industry is a very important one and it was felt that the time had arrived to give more intelligent care to her timberlands. The conference lasted nearly all day and the Premier took part for a few minutes. The Minister listened to all that the advocates of a forest service had to say, but decided that the time was not yet ripe for such a step in view of the fact that the Province has practically no revenue from its Crown Lands and the Minister feared that if such a step were taken the expense might increase from year to year. He was willing to take the step if some means of financing it could be found and an effort will be made to get the timberland owners of the Province to subscribe sufficient money to engage a Provincial Forester. Nova Scotia has had a pretty good forest fire record until the past season when the fires were bad and a good deal of timber and some property was destroyed.

Mr. Leon A. Nix, a graduate of Syracuse Forestry School, and recently with the Chemical Division of the United States Army, at Baltimore, has been made assistant to Mr. Galarneau, Forester for the St. Maurice Paper Company, with headquarters at Three Rivers, Quebec. Mr. Galarneau will begin his work with a map and estimate of the timber lands of the company.

The annual Forestry Conference under the joint auspices of the Canadian Forestry Association, Co-operative Forest Protective Association of Quebec and the Woodlands Section of the Canadian Pulp and Paper Association, was held in the Windsor Hotel, Montreal, on the 29th and 30th of January. This is the blue ribbon forestry event of the year in Canada and was attended by practically all of the pulp and paper and lumbermen of Eastern Canada. The subjects discussed were all thoroughly practical. Colonel Graves of the United States Forest Service, Brigadier-General J. B. White, D. S. O., commanding

the Canadian Forestry Corps, and Mr. E. C. Hirst who did such good work with the New England Lumbermen's Unit in Scotland told how lumbermen helped to win the war. There was a very interesting discussion on the necessity for slash burning to reduce the number of forest fires and to help prevent insect ravages. A full discussion by experts of the use of flying boats or aeroplanes in forest fire patrol and forest mapping and reconnaissance illustrated by moving pictures and lantern slides. The use of light tractors in logging operations was considered and an actual demonstration was given. The committee of the Woodlands Section on possible improvements in logging operations brought out much discussion of interest, and the meeting was a very live one.

The staff of the Duck Mountain Forest Reserve, of the Dominion Forest Service, have sent out a very attractive calendar showing, by photographs of trail cutting, brush disposal and railroad logging, the activities of the District.

The Minister of Lands and Forests of Quebec will introduce at the next session of the Legislature a bill which it is hoped will help to put the present excellent forest fire protection system on an even better basis.

Mr. G. C. Piche, Chief Forester of Quebec, has gone to France on personal business. It is rumored that he will try and bring back some large contracts for timber.

Mr. R. H. Campbell, Director, Dominion Forest Service, has now quite recovered from his serious accident of last summer and is back at work again, much to the satisfaction of his numerous friends.

The "Alberta Inspection News Letter No. 7," for 31st December is out and is of much interest and full of news of the men of the District and those of the force who went overseas. This letter is gotten out by Mr. E. H. Finlayson, in the interests of his District and is very creditable indeed. We hope it will be continued for the future. Most of the staff have been suffering from influenza and he says "The past few weeks have just "Flu" by. "One of the rangers has been having a good deal of trouble with the Indians writing all over his fire signs, so recently he sent one of these to the Indian Department at Ottawa for translation and found that

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It is I who wrote this."

The fire season in Alberta has been satisfactory and little damage is reported. Mr. MacDonald, who went overseas from this District, wrote that after falling 15,000 feet in his aeroplane he was a prisoner in Germany and wanted some books sent over so that he could while away the time and improve his technical knowledge. He marked it "Censor-Please rush" evidently having a hunch that the war might soon be over. The Nursery work on the Cypress Hills during the past season was rather unsuccessful owing to much frost and drought. Fourteen men are expected back soon from the front which will enable the staff to resume its old time activities with renewed vigor.

Major W. N. Millar, who went over with the Tenth Engineers, has returned to the University of Toronto to take up his teaching again. He is reported as saying that he thinks that if some military discipline and methods could be put into forestry work and lumbering that it would be a very good thing. He says that whereas ten hours extra work for having a button on one's jacket undone may seem harsh, he feels that such attention to details makes for a better job, and that if all the little things are in order and well looked after, the job as a whole must be a better one.

Prof. R. B. Miller, of the University of New Brunswick, is taking a course at the

Yale Forest School this winter and his place is being taken by Mr. L. S. Webb.

The Laurentide and Riordon Paper Companies have co-operated in buying 1,500,000 spruce trees to plant the coming spring, in addition to those from their nurseries. They will each plant about one million trees.

Copies of "España Forestal" which were held back by the war for the past year have just been received, together with the bulletins of the Spanish Forestry Association. These are very interesting and thoroughly up-to-date giving reviews of the forestry publications in many countries, including American Forestry. There is an interesting article about a forestry meeting held in Spain in 1805, another on forest fires in Teneriffe, one on insect pests, and many others well worth mentioning did time permit. The get up and illustrations are excellent, reminding one of the American Forestry Magazine. It is very interesting to see the different view point of the Spanish Foresters, which leans much more toward the esthetic side, so that we have articles on the beauty of the forest and of famous trees and some very good poems together with scientific and technical articles.

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BOOK REVIEWS

Mrs. Allen's Cook Book, by Ida C. Bailey Allen. Small, Maynard & Company, Boston. Price, \$2. In commenting on this volume, just off the press, Lewis B. Allyn, Food Editor of the McClure Publications, well says: "The chemical composition of the body requires foods of similar composition. The author of this book in a delightfully simple manner has presented the problem so that, generally speaking, the body may extract from the foods the maximum amount of building and fuel material with the least expenditure of dynamic energy."

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Trees, Stars and Birds—A book of outdoor science, by Edward Lincoln Moseley, head of the science department, State Normal College of Northwestern Ohio. Illustrated. Price, \$1.40. Published by World Book Company, Yonkers-on-Hudson, New York.

The innate desire of the child to know about nature out-of-doors carries educational possibilities that cannot be ignored. But nature study as such is still new in the schools and courses and methods have hitherto not been well defined. Everything has been left to the already busy teacher, including choice of subject matter, presentation and conduct of field work. The lack of a suitable textbook has been a serious handicap. To overcome this was the purpose of Professor E. L. Moseley in preparing this new nature study book.

Trees, Stars and Birds covers three phases of nature study that have a perennial interest, and it contains material that will make the benefit of the author's long and successful experience available to younger teachers.

The author is one of the most successful teachers of out-door science in this country. He believes in field excursions, and his text is designed to help teachers and pupils in the inquiries that they will make for themselves. Approximately equal sections are devoted to the three phases of the subject. The topics dealt with are those of most general interest.

The text is well adapted for use in junior high schools, though the pres-

entation is simple enough for pupils in the sixth grade. The book can also be used to advantage by such organizations as the Campfire Girls and the Woodcraft League.

CATALOGUES RECEIVED

The beautifully illustrated 1919 edition of the catalogue of Richard Diener Company—gladioli specialists—of Kentfield, California, has just come in.

A booklet—"The Gladiolus Beautiful"—has been put out by Howard M. Gillet, of Lebanon Springs, New York, with full price list for bulbs.

"Burbank's 1919"—a catalogue of fruits, flowers and various economic plants has come in from Burbank's Experiment Farms, Santa Rosa, California.

The Southern Pine Association of New Orleans, Louisiana, is publishing a series of booklets, artistic, extremely practical and well illustrated, noticeable among which is one called "Beauty Plus Service in Floors."

"The Modern Gladiolus" with full descriptions and price lists, issued by George S. Woodruff, of Independence, Iowa.

THE Augusta, Georgia, Chronicle makes note of the sale of the nursery and landscape business of the P. J. Berckman's Company, Fruitland Nurseries, Augusta, Georgia, to Mr. Sigmund Tarnok.

NATIONAL LUMBER CONGRESS

A NATIONAL Lumber Congress which is to eclipse anything ever held before in that industry has approached definite form with the announcement of tentative dates, probable speakers and other interesting data.

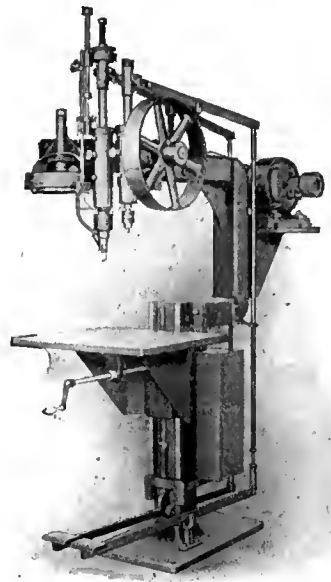
The Congress will be held at Chicago April 14th, 15th and 16th, according to Dr. Wilson Compton, Secretary-Manager of the National Lumber Manufacturers Association, who is busily engaged in planning the details of the proposed affair. It will immediately precede the annual meeting of the National Association on April 17th and it will take in all branches of the industry in a nation-wide discussion of export and domestic problems.

Trade Extension, Lumber Economics and Logging Operations will be among the subjects for the Congress, while the list of speakers so far prepared includes W. B. Colver, chairman of the Federal Trade Commission, tariff commissioner, and B. S. Cutler, chief of Bureau of Foreign and Domestic Commerce.

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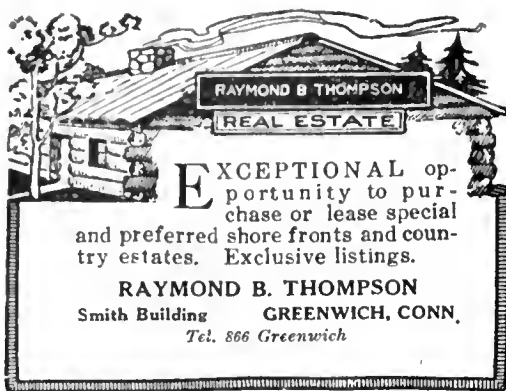
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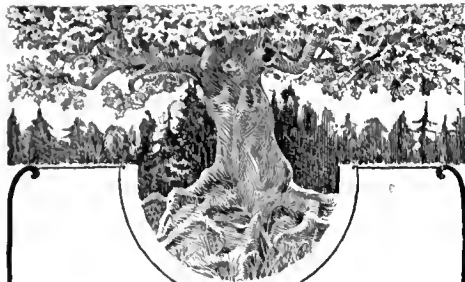
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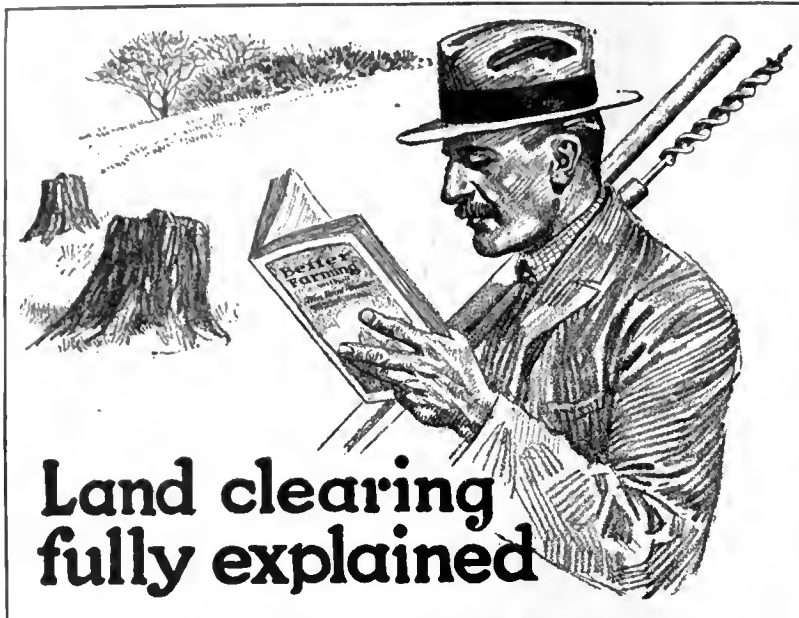
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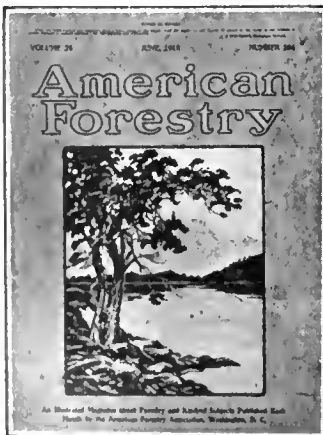
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AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

MARCH 1919 VOL. 25

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No. 303



International News Service

EVEN THE RHINE RISES AGAINST THE EX-KAISER!

As if to emphasize the tragic isolation in which that unhappy man finds himself, the house in Holland in which the ex-kaiser has taken refuge is now cut off from the rest of the world by far-spreading floods—and it is the Rhine of all rivers which has thus risen against the fallen war lord of the huns. The photograph shows a magnificent avenue of trees in the rear of the castle, completely flooded, which the ex-kaiser was in the habit of using as a promenade.

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Underwood and Underwood—*British Official Photograph*

WOODLAND ALONG THE ANCRE AFTER SEVERE SHELL-FIRE

Through what was left of these woods the British drove the Germans. The trees show the effect of shell and rifle fire of both armies. Few if any of those still standing escaped wounds from shell, shrapnel scrap, machine gun and rifle bullets. The whole woodland will have to be restored, but it first must be cleared of shattered trees, stumps and other debris.



Underwood and Underwood—*British Official Photograph*

ROAD BLOCKED BY FELLED TREES

Thousands of trees were cut down by the Germans to block roads as they retreated and this condition which hampered the British advance near Harrincourt shows how the fine trees which line so many of the roads through France were sacrificed. It will take scores of years to grow others to take their place.

AMERICAN FORESTRY

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MARCH, 1919

NO. 303

FOREST CASUALTIES OF OUR ALLIES

BY PERCIVAL SHELDON RIDSDALE
EDITOR OF AMERICAN FORESTRY

This is the first of a long series of articles on the effect of the Great War on the forests of Europe, articles based on information secured during a tour of Great Britain, France, and Belgium during December, 1918, and January and February, 1919. This trip was taken for the purpose of investigating the war time losses in the forests of these three countries and of ascertaining how best America can aid in restoring these forests.—EDITOR.

Paris, France, January 20, 1919.

THE Peace Conference is to determine how Germany shall supply France, Great Britain, Belgium, and Italy with lumber which these countries lost in the Great War; lost by the cutting of the forests by the Allied armies, the cutting for army requirements or the shipping to Germany for civilian uses by the Germans, and the destruction of the forests and woodlands by the shell, shrapnel and rifle fire of the contending armies.

This action will result in the replacement of actual losses of timber, but it will not restore the cut over and the devastated forests.

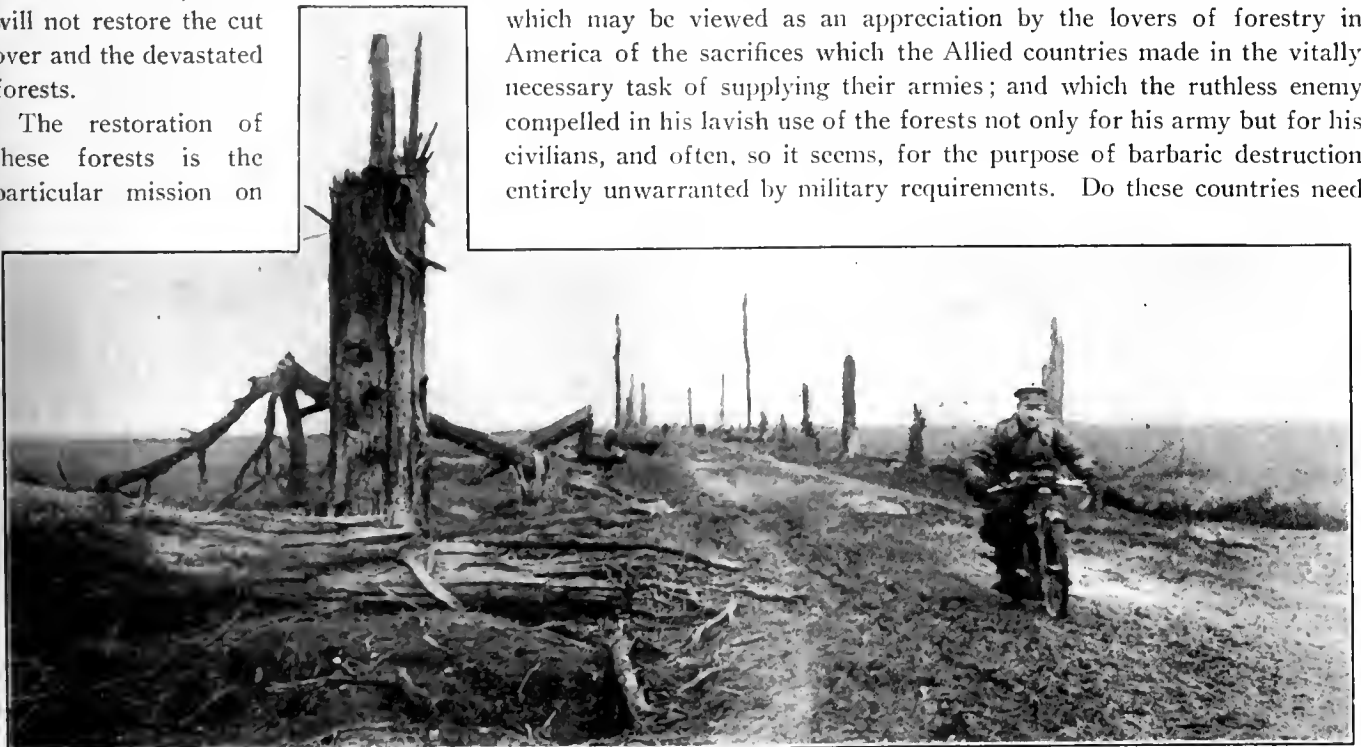
The restoration of these forests is the particular mission on

which the American Forestry Association sent the writer to Europe, a mission requiring an examination of the forests and woodlands, not only on the battle front, but also behind the fighting area and in Great Britain.

As a result of the inquiries, which established most forcibly the need of reforestation, the American Forestry Association has undertaken the patriotic task of supplying France, Belgium, and Great Britain with a quantity of American forest tree seeds

A series of articles on the forest conditions in France, Belgium, Great Britain, and Italy, and also on the work of America's forestry regiments will follow month by month. They will be well illustrated by photographs secured especially for the purpose.

which are to be used in the work of restoring the depleted forests of these three countries. This is an endeavor, gratefully accepted by the Europeans, which may be viewed as an appreciation by the lovers of forestry in America of the sacrifices which the Allied countries made in the vitally necessary task of supplying their armies; and which the ruthless enemy compelled in his lavish use of the forests not only for his army but for his civilians, and often, so it seems, for the purpose of barbaric destruction entirely unwarranted by military requirements. Do these countries need



Underwood and Underwood

ONCE A TREE SHADED ROAD

The path of desolation which remained after the German advance along the Amiens—St. Quentin Road where desperate fighting prevented them from reaching their object, the big supply station of the British at Amiens. Many of these trees were a hundred years old.

help in restoring their forests? It did not require a long examination to make a reply to this question. Belgium has lost practically all her forests. Fifty per cent of the timber and woodlands of England, Scotland, Wales

not only was able to supply army requirements but was able, by reason of her forests, to retain her liberty and save her national soul. Had it not been for the defensive value of the forests of northern France, which enabled her to hold back the invaders, and for their offensive value, permitting the secret gathering of large bodies of troops for attack, France would early in the war have been overrun and defeated by the Germans. Her forests saved her and in this one respect alone she is more than amply paid for all her work and all her expenditures on them during the last one hundred and twenty-five years, the period for which a definite forestry system has been in force.

Can Germany Repay the Allies?

The ability of Germany to repay, in timber, the losses sustained by France, Great Britain and Belgium has been carefully studied by forest experts of these countries. The result of these



TRENCH AND UNDERGROWTH WHICH SHELTERED THE GERMANS

In Belleau wood near Chateau Thierry where Americans first aided in stopping the last great rush of the Germans the trenches and undergrowth and shell felled trees were over run by the valiant Americans and the Germans driven out after terrific fighting.

and Ireland has gone, and every tree in Great Britain would have been cut had there been transportation for them to the sawmills, while France with great forest wealth and her forestry system highly developed, lost fully one-tenth of her forests. In the battle-scarred sections of northern France some million and a half acres of forest are today devastated and of little value except as fuel wood while large areas of her forests, governmental, communal and privately owned, have been cut over to supply the needs of the French, American, British, and Canadian armies.

France had not only to see her forests destroyed in the actual fighting and in the movement of armies, but had to supply her own army and those of her allies with wood for their numerous military needs. This had to be done because lumber could be more readily secured in France than anywhere else, and France, thanks to her splendidly developed system of forestry,



VIEW IN SHOT-SWEPT BELLEAU WOOD

A tangle of wrecked trees, matted undergrowth, massive rocks, wire entanglements and damaged trenches and machine gun nests are to be seen where the marines and other forces of the American Expeditionary Force scored a hard won victory over the Huns near Chateau Thierry. The writer in the lower right hand corner.

studies will be placed before the members of the Peace Conference as soon as the work, which is now under way, is completed. The information for the American delegates is being gathered under the direction of Colonel

C. S. Chapman, of the Twentieth Engineers, who is also to make a report on the forest losses in France and Belgium.

One unofficial report just available as I am leaving Paris is that of Sous-Directeur G. Huffel, of l'Ecole Nationale des Eaux et Forêts, who says:

"Our French forests have terribly suffered from the war. The fellings made for the needs of the army, those made by the enemies with an incredible vandalism in the regions which he occupied—just the most wooded parts of the country—have impoverished or ruined them

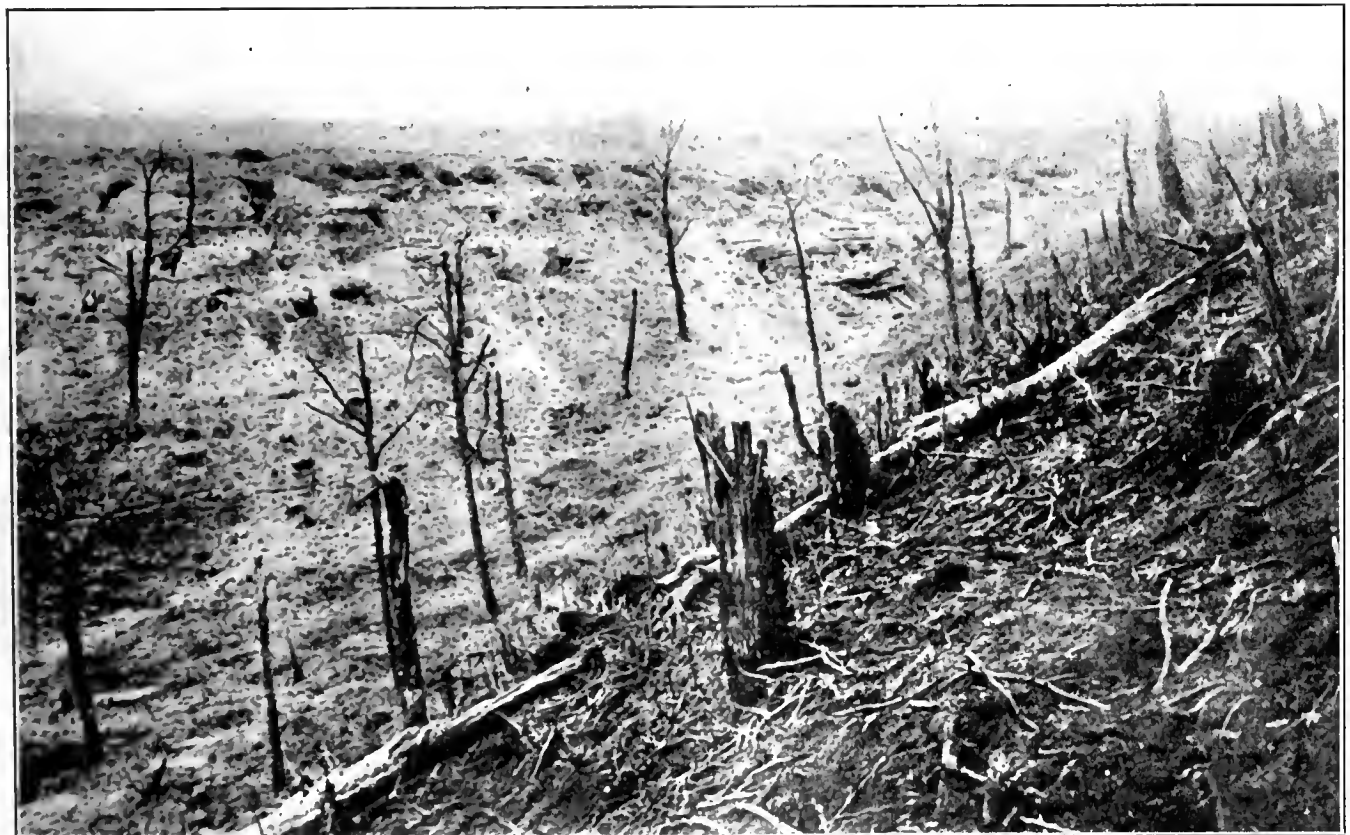
for a long time. As regards the groups of timber located on the front lines, too often nothing remains of them.

"This situation is all the more alarming as our needs will certainly increase by enormous proportions. We have to rebuild our houses, our furniture, our machinery. Neither our own resources nor the resources of the world-wide market will be sufficient, by a great deal. It will then be necessary to have recourse to German forests, to take from them all timber we need and which Germany owes, because she ruined us. From the last



DESTROYED BY SHELL FIRE NEAR VERDUN

Such scenes as this are typical wherever there has been an intense bombardment of wooded areas in northern France. Only the skeletons of trees are left and these will rot, decay and fall in a few years.



Underwood and Underwood

RESULT OF FIRE ON GERMAN DUGOUTS

The targets for the tremendous shell fire which destroyed the trees in this narrow valley were the German dugouts, the remains of which may be seen on the farther side of the valley. So terrific was the bombardment that the dugouts were destroyed, the Germans driven out and not a tree remains alive.

official statistics, the total area of German forests (not including the forests of Alsace-Lorraine) is of 16,341,700 acres, of which 10,663,700 acres are State Forests, *i. e.*, forests belonging to various States, and 5,677,900 acres belonging to the Communes or to the Public Establishments. These forests are composed, above all, of resinous trees; Scotch Pine covers about half of the area (exactly 47 per cent), and Spruce the fourth part of the total area. Among deciduous trees, the Beech is by far the most widely distributed.

"Statistics show what are, for all classes of forests, the areas occupied by timber of different ages. Thus we can state that there exists, in the bulk of German forests, 7,867,000 acres of timber of more than 60 years of age, which may be used for carpenter's work, *i. e.*, as lumber. Half of this area is covered by Scotch Pine, more than the fourth part by Beech, and a little less than the fifth part by Spruce.

"If, not considering the bulk of German forests, we prefer only to consider forests belonging to different States, we find that Domani-ales forests contain 4,032,000 acres of timber of more than 60 years of age. To this quantity may be added 63,950 acres of Communal Pine timber located in the Grand-

Duche de Bade and in Wurtemberg. On this basis, it is easy to state what volume of lumber is immediately available, in the State forests. This volume is at least 338 millions of cubic meters. More than the third part is Scotch Pine which is excellent timber for lumber, the fourth part is Beech which can be used for lumber, and for railroad ties. Spruce and Fir will produce three millions of plain boards. Oak will also be welcomed by our cabinet-makers and carpenters who fear the lack of this raw material.

"The value in money of these 338 millions of cubic meters of standing timber will amount to 5,400,000,000 francs (\$1,000,000,000) if we take as a basis the sale prices realized during the last ten years in the bulk of German State forests. At the present rate, the value will be double and more, and perhaps triple. The material coming from the Communal Fir timber of the Grand-Duche de Bade and Wurtemberg, represents eight millions of cubic meters able to produce 250 millions of boards valued at the pre-war rate about 200,000,000 francs (\$36,700,000) on standing, and more than the triple at the actual rates.

"How many labor days will be necessary to market those 350 millions of cubic meters of timber, and how

many years will this work take? Is the world-wide market able to absorb without trouble this enormous quantity of products?

"The first thing to do is to forbid or at least to seriously regulate and reduce, during the period of realization of this material in State forests, any other felling of timber on the territory of the Empire, in order to reserve the forestry labor available in Germany. This point being agreed upon, it is easy to calculate that to fell and manufacture the



Underwood and Underwood

CONDITION AFTER A BATTLE

The destruction in this small patch of woodland was caused by an attack by the Germans on a British position. The Huns were driven back with heavy losses, but not before the concentrated fire from both sides cut the trees in the fighting area to pieces.

stock of lumber from German Public forests, 100 millions of labor days, plus the indigenous labor, will be necessary. To clean up this work in a year's time, this means to get 330,000 workmen, and this seems impracticable. If we prorate the felling for a period of five years, a body of 50,000 foreign woodsmen in connection with indigenous foresters, will be quite sufficient.

"There is no doubt that timber thus spread over the market could be easily absorbed.

"Before the war, in fact, France had to buy in foreign



Underwood and Underwood

AFTER BEING STRUCK BY A SHELL

A tree struck squarely by a shell as this was by a 75 m. shell is usually torn into splinters. This one stood near Vitry le Francois.

countries, five millions of cubic meters of lumber, and the United Kingdom bought more than fifteen millions of cubic meters. The latter received prodigious quantities of mine props furnished by our pine timber in the Landes. At the present time, the forests in the Landes will not be able to furnish any timber for a period of years. Furthermore, the export of timber from Russia, which supplied a large part of the needs of the British, will now be reduced or suppressed for a long time. Our Allies of the United Kingdom will then have to take for their own needs a large part of the enormous felling to be made in Germany.

"Besides we must consider that the Germans themselves, especially after we shall have issued orders to forbid any other felling that may interfere with our own operations, as mentioned above, could be authorized to receive part of the products of the felling in case some timber

would remain unnecessary for our allies and ourselves. Probably we would not refuse to cede them some timber, eventually, at a reasonable rate."

Forestry Losses in France

French soil having been the chief battle ground it is proper to first of all consider the forest conditions and plans for restoration of her forests.

The total area of the French forests situated in the fighting zones and in the regions which were long occupied by the enemy, or subject to his fire, has been estimated in round numbers at 1,482,600 acres.

The principal varieties of trees which make up these forests are as follows:

Among the deciduous trees: The Common Oak (*var. Quercus sessiliflora* and *Quercus pedunculata*), the Beech (*Fagus sylvatica*), the English Hornbeam (*Carpinus betulus*), the Ash (*Fraxinus excelsior*), the Elm (*Ulmus campestris*), the Birch (*Betula alba*), and the Alder tree (*Alnus glutinosa*).

Among the indeciduous trees: The Fir (*Abies pectinata*), the Norway Spruce (*Abies* or *Picea excelsa*), the Scotch Pine (*Pinus sylvestris*) and the Black Pine of Austria (*P. laricio Austriaca*).

These varieties are scattered very differently according to the regions. The deciduous trees predominate in the north of France (Departments of the North, of the Somme, of the Pas-de-Calais, of the Aisne, of the Oise, of the Ardennes, and of the Meuse). On the contrary in



Underwood and Underwood DAMAGED CAUSED BY ONE SHELL

One shell, a large one, struck this tree and the photograph shows its effect. Thousands of trees in all forested fighting areas were struck squarely during the storm of shell-fire and were destroyed in this manner.



Underwood and Underwood

FOREST VALUABLE FOR OFFENSIVE OPERATIONS

Three artillery pieces and one French artillery officer are to be seen in this heavily wooded section of the Argonne Forest, but so well camouflaged are the pieces that they are not visible at a short distance unless the observer knows just where to look for them. In woods such as these it is easy to conceal thousands of troops so well that the enemy airmen cannot discover them. One hundred and fifty-five pieces of artillery were concentrated at this place.

the East the fir and the spruce constitute the greater part of the woods in the mountainous part of the Department of the Vosges; and, in the chalky plains of the Champagne (Department of the Aube and of La Marne), the Austrian black pine is very common.

The principal forests belonging to the Government which are not in the regions in question are:

Mormal, 22,649,186 acres; Nieppe, 5,728 acres; St. Amand, 8,191 acres; St. Michel, 7,568 acres; Chateau-Regnault, 13,397 acres; Signy, 7,860 acres; Sedan, 9,496 acres; Moyeuivre, 5,189 acres; Compiègne, 22,239 acres; Laigue, 9,439 acres; St. Gobain, 7,904 acres; Retz, 14,826 acres; Concy-Basse, 5,322 acres; Lachalade, 5,436 acres; Spincourt, 5,189 acres; Lisle, 6,671 acres; Sommedieu, 4,942 acres; Les Elienx, 5,189 acres; Parroy, 6,424 acres; Bois-Sauvages, 5,310; Valde Senones, 10,331 acres; Rambervillers, 13,679 acres.

The forests belonging to Communes or to private individuals are:

Mazarin, 7,029 acres; Sauton, 5,169 acres; Boux, 17,222 acres; La Fague, 10,827 acres; Nouvion, 9,234 acres; Ban Lemonic, 11,633 acres; Valtin, 3,867 acres.

It is very difficult to estimate at present, with any accuracy, the area over which the forests in these regions have been devastated, the methodical and detailed examination of these ravages being still under way by the forestry department of the French Government, con-

sequently it is impossible to determine with precision the area on which the work of reforestation is to take place.

Moreover, independently of the wooded tracts which were more or less completely destroyed and which are to be totally or partially reforested, it is proper to take into consideration the agricultural lands which, having experienced a tremendous upheaval from artillery fire, mines, or works of defense will no longer be utilizable except through reforestation.

At all events it does not seem to be exaggerating to estimate at 741,300 acres the total of the lands on which work of reforestation will have to be undertaken, 494,200 acres of forest lands and 247,600 acres of agricultural lands having been ruined.

They will be reforested, as the case may be, either by planting or seeding. The nature of the land and its condition on the surface, the nature of the forest trees to be employed, and on the other hand the labor resources will involve the choice of one or the other of these methods.

It may be estimated that the area planted will be 444,780 acres and the area seeded 276,520 acres, which will necessitate, altogether, the use of 720,000,000 saplings and 1,851,864 pounds of seed of different varieties, or 72 million saplings and 185,186 pounds of seed per year, assuming a period of ten years as necessary for the execution of the work.

Native trees will naturally be utilized for the great majority of the forest areas to be created, and among them the oak, the beech, the ash, the fir, the spruce, and the Scotch pine will occupy a preponderating place.

It is certain, however, that France may use to advantage, in a certain measure, foreign varieties which have already proven successful in France, and this enabled the Administration of Waters and Forests to accept with gratitude the offer of the American Forestry Association to place at its disposal seed of American trees to help reconstruct the French forests.

If among these seed there are some, such as those of the Douglas fir and the Weymouth pine, to which France gives a very marked preference, it is owing to the following reasons:

The Douglas fir, *Pseudotsuga Douglasii*, known in France as the "Sapin de Douglas," was introduced there in 1826; and it has thus far proven there to be hardy under all conditions, the great cold of 1879-1880, 13° below zero, not having affected it. Placed in an environment which suits it, it prefers somewhat cool silicious soils, it grows rapidly and is capable of giving good yields. It is a variety destined to have an assured future in France as a forest tree. Fine masses of it are now

found in the center of the country, particularly in Sologne.

The Weymouth pine (*Pinus Strobus*), the Pine of Lord Weymouth, is of no less interest to France. Its introduction in Europe is very ancient, being said to have taken place in England toward 1705 through Lord Weymouth. Although of very great hardiness and rapid growth, it spread at first very slowly on the old continent; but after about 50 years its use greatly developed. It was introduced advantageously in moist and even peaty soils, particularly those of the Vosges, where it gave exceedingly satisfactory results.

Cultivated on lands which suit it, that is, on cool soil which is of a silicious or clayey nature preferably, it grows with great vigor. It is a fully settled fact at present that this species is also capable of being employed successfully in France in the reforestation of certain lands.

France Accepts Help

Following a trip to the battlefields, principally those upon which the Americans fought, the writer had the pleasure of presenting to the French Government officials the offer of the American Forestry Association to provide France with American tree seed to reforest not only sections of devastated forest land but for use



Underwood and Underwood—British Official Photograph

A COMBINATION OF DESTRUCTION

The Huns not only destroyed by fire this fine old Chateau in the Flanders section of the battle front, but cut down all the fruit and ornamental trees surrounding it. Their explanation might be that of military necessity, but to the civilian it looks much like wanton destruction.



Underwood and Underwood—British Official Photograph

WRECK OF A WOODLAND NEAR LE BARQUE

Wherever trees were subjected to concentrated artillery fire the result was much the same as indicated by this photograph. Almost invariably some remained standing but all are so badly wounded that they will die.

on agricultural land so badly torn by shell fire that it is no longer of agricultural value. Such land may ultimately be restored for agricultural purposes after being planted as a forest for nature then may very gradually heal the scars of war.

At the conference held in the Ministry of Agriculture in Paris were M. Dabat, Directeur General des Eaux et Forets au Ministere de l'Agriculture; M. Leddet, Conservateur des Eaux et Forets au Ministere de l'Agriculture, Chef du bureau des reboisements; M. Eymeri, Conservateur des Eaux et Forets au Ministere de l'Agriculture, charge du service des exploitations forestieres de guerre, representing the French Government; Major Theodore S. Woolsey, Jr., Chief of the Paris office of the forestry section of the American Expeditionary Forces; Capt. Maurice Fresson, liaison officer, and the writer.

M. Dabat with many expressions of gratitude accepted the offer and later in an official letter of acceptance, said:

"I am highly appreciative of the kind offer which you have made to me on behalf of the American Forestry Association and according to which the latter proposes to place at the disposal of the General Bureau of Waters and Forests considerable quantities of American forest seed to help replenish the French forests devastated by the events of the war.

"With deep gratitude do I accept the generous collaboration of your Society in this vast work which is so neces-

sary in order to restore the painful ruins accumulated on our soil as a result of the terrible war in which the American nation contributed so powerfully and so valiantly toward bringing to a glorious conclusion.

"I therefore have the honor to request you to express my sincere thanks to the American Forestry Association.

"The American forest seed capable of being used to advantage in the proposed reforestation are primarily those of the Douglas fir (*Pseudotsuga Douglasii*) or Oregon pine and of the Weymouth pine (*Pinus Strobus*), which have proved successful in our country and can be utilized there to a considerable extent.

"Besides them, we should be interested in receiving small quantities of the blue variety of Douglas (Colorado Douglas fir), of *Pinus monticola* (Western White pine), of *Pinus resinosa* (Red pine or Norway pine), of *Larix occidentalis* (Western Tamarack), and of *Picea Stichen-sis* (Tideland spruce), all being varieties whose use cannot really be rendered general until experiments have been made with them in nurseries or on small areas."

These facts, together with information about conditions in Great Britain, Belgium and Italy have been forwarded to the Board of Directors of the American Forestry Association, and are to be presented to the members of the Association. Later plans for the collection of the seed needed by the Allies will be considered and announced in the magazine.

THUNDER MOUNTAIN

BY HENRY S. GRAVES

CHIEF FORESTER, UNITED STATES FOREST SERVICE

IN THE high mountains of Central Idaho there is an area of over a million acres that tells the story of what would have happened in the western mountains if the National Forest system had not been established. It is an area of public land, rich in forest, mineral, water,



THE THUNDER MOUNTAIN REGION IS A VAST WATERSHED

An important source at the headwaters of the Columbia River. The streams are swift, and there is an immense amount of potential water-power in the region.

and grazing resources, in which abuse by fire and over-grazing has wrought such havoc that the whole region is becoming a menace to both the local and the general public. It is surrounded by National Forests, in which for over twenty years there has been protection from fire, careful regulation of grazing, progressive development of trails and other improvements, and a foundation of industrial upbuilding and prosperity.

The Thunder Mountain country was not included within the National Forests because of local opposition. Within the area are valuable mineral deposits, and just prior to the establishment of the National Forests in Idaho there was a stampede of miners from all parts of the West into that region. Thousands of sanguine prospectors poured in, and mining camps sprang up as

if by magic. A beginning was made in building roads, trails, and bridges. Money was lavishly spent, merchants prospered mightily, and Idaho regarded the Thunder Mountain region as a future center of great industrial development. It was feared at that time by many people in Idaho that the existence of the National Forests might operate to retard mining development, and the public sentiment against including Thunder Mountain in a National Forest was so great that it was left as open public land unprotected and subject to the abuses of unregulated grazing of sheep.

The region now stands out in striking contrast to the surrounding National Forests. While in the Forests the resources have been saved and are being progressively developed, the Thunder Mountain region is being rapidly ruined, industrial development has practically stopped, and unless steps are taken at once to bring this



TIMBER OF ECONOMIC IMPORTANCE

The dense Lodgepole Pine makes an admirable soil cover. It also produces material of great importance in mining.

area under protection and control of the public, Idaho will not only have an unproductive waste but will suffer seriously through injury to an important water system.

The mining boom collapsed when the more available mineral pockets were exhausted, and when it became

apparent that permanent development could come only with the importation of large quantities of heavy machinery for the purpose of working deep mines.



AN ABANDONED MINING CLAIM

In boom times the miner built his cabin at a point conveniently near his claim, living on in the hope that the country would be opened up. Most of them have abandoned the country, and development must wait until the area can be added to a National Forest and roads built to the mines.

There was required the construction of roads to make possible the opening up of the rich mining resources of the region. This was impracticable without Government aid, and the area was shut off from possible aid of the road funds appropriated for the improvement of the National Forests. Then the miners drifted away to newer points of interest, leaving deserted towns and prospect works as witness of the former mining activities. The region became almost depopulated. The old roads and trails which had been built have been largely washed out and destroyed. Forest fires, which in the early days were often set by prospectors to clear off the ground in order to make exploration more simple, destroyed millions of feet of timber. Lightning and carelessness also started many fires; and from year to year great areas were burned over, the fire rapidly destroying forests which were of great prospective value for lumber and for the needs of mining and other local development. Not less than 300,000 acres in this region

have been burned. Timber with a potential value of at least a million dollars has been destroyed, and the process of attrition by fire is going on each year, so that in time, if present conditions continue, a great resource will have been wiped out. The region has become, too, a constant menace to the surrounding National Forests because of the danger that the fires, gaining headway under strong winds, may sweep over into the timber which the public is endeavoring to safeguard.

But the most serious aspect of the present situation is the inevitable injury which is already seriously threatening an important element of the headwaters of the Columbia River. The Thunder Mountain region is of unusual importance as a source of water. It is a high mountainous region, ranging in elevation from 3,500 to nearly 10,000 feet. Most of it is above 6,000 feet, which means that there is a comparatively heavy precipitation. Of special im-

portance is the fact that the snowfall is heavy, normally remaining until late in the spring or early summer. The



A TOWN THAT IS NO MORE

The town of Roosevelt was a prosperous mining village, typifying the hope of the prospectors who in the early days rushed into the Thunder Mountain country. In 1907 the town was wiped out as the result of a landslide that dammed the river and flooded the valley.

mountains are broken and rugged and the slopes for the most part steep. While there are many rugged peaks and lofty ridges, most of the area is not above

timber line. In fact fully 85 per cent of the land originally was covered with forest of greater or less density.

The natural forest on this rugged mountain area is typical of the upland regions of central Idaho. In places there are even today fine stands of yellow pine and Douglas fir. It is not uncommon to see trees four or five feet in diameter. Along the streams one finds abundant Engelmann spruce, while the most common tree is the lodgepole pine, occurring in some places as dense pure stands and elsewhere in mixture with yellow pine, spruce, and Douglas fir. Then at the higher elevation, just as elsewhere in the Rocky Mountains, one encounters Alpine fir and white-bark pine. It was an admirable forest. It formed a protective cover for the steep slopes and narrow ravines and canyons, and safeguarded the regularity of the waterflow.

The region is one vast watershed. Innumerable streams distribute water in great quantities into the tributaries of the Columbia River. The supply of water is estimated at a minimum of approximately

power in excess of 100,000 horsepower, which ultimately can be generated.

The watershed is being ruined. This is partly through



TREE GROWTH PERSISTS

Even the steepest slopes are capable of supporting trees. The character of the soil and steepness of the slopes make it essential that the slopes be protected by as much forest growth as possible.

the great destruction of the forests, with the inevitable effect on the rapidity of the melting of the snow in the

spring. More serious, however, is the injury to the ground surface by the excessive and utterly unregulated grazing of sheep. If this area had been under careful regulation, it might be possible to graze upon it as many as 75,000 head of sheep without injury to the watershed and without injury to the productivity of the forest. Increasingly, stock men have been rushing sheep on this area, absolutely regardless of the effect of the over-grazing on the forest range itself or upon the watershed. During the past season it is estimated that there were about 300,000 sheep ranged on the area. Not only is this overgrazing destroying the better grasses, but the soil is being rapidly washed away. Gullies are being cut that already are from one to two feet deep and



SLOPE RISING ABRUPTLY ABOVE A STREAM

These slopes today are being burned over by forest fires. Over-grazing by sheep is already starting myriads of gullies which promise to have a serious effect on the stability of the waterflow.

1,000 second feet. Many of the streams have a rapid flow, averaging about 100 feet to the mile, and it has been estimated by some that there is potential water-

which with every flood are being scoured out to a greater width and depth. Portions of the area are described by forest officers as practically a dust heap. It is said that

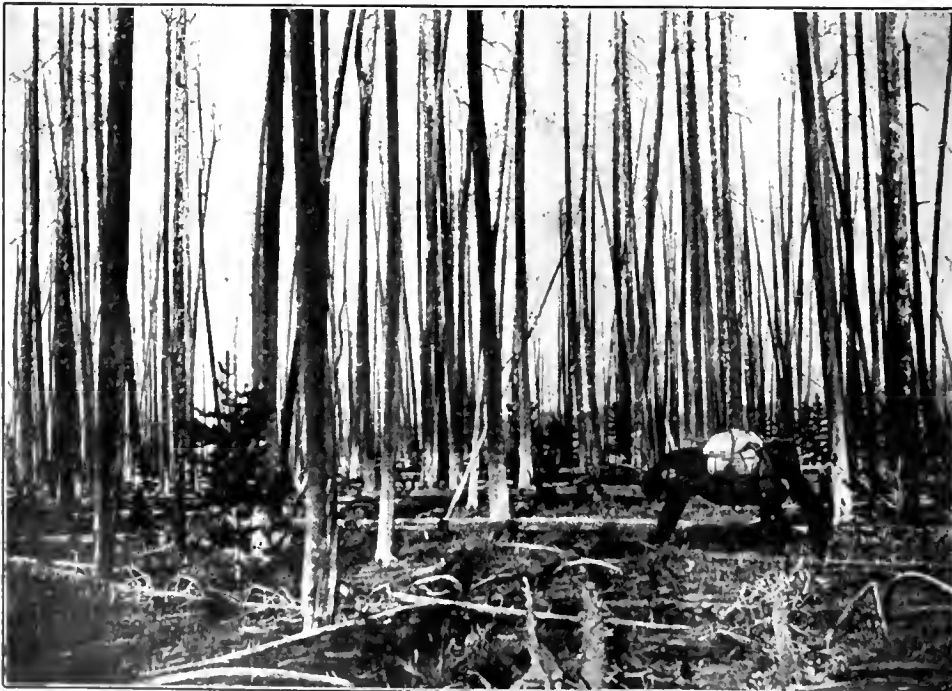
the southern end of the area is so devoid of forage suitable for horses that practically nothing can live there except sheep and that during the past season the sheep themselves were forced to eat grasses and plants that they are never known to eat except in extreme cases. The actual effect of the destruction of the timber and of the overgrazing is already noticeable. On one important stream the high water period is at least one month earlier than on streams in the National Forests, under precisely similar conditions, where the watersheds are protected.

It is not yet too late to save the Thunder Mountain country and to make it a source of wealth and general public benefit to the State of Idaho and to the country. There is still upon this great area an aggregate of between two and three billion feet of timber; and while the timber is comparatively much less accessible than a great deal of other timber owned by the public and by private individuals, it will nevertheless ultimately be of great importance. Its destruction would be a calamity. When the National Forests were put under administration there were other areas which had been greatly overgrazed. The placing of the Thunder Mountain region under strict grazing regulations would make it possible within a few years to begin the restoration of the natural grass cover, which, together with the forest, is indispensable to the protection of the watershed. The development of the great mineral resources of this region is hopelessly blocked until the area is incorporated into a National Forest system so that roads can be built. The protection of the forests, the regulation of the grazing, and the building of trails and other improvements would set in motion a progressive development of the region



PICTURESQUE WHITE-BARK PINE

The white-bark pine grows on precipitous slopes and is of value in holding the soil. It often assumes a most picturesque form.



FIRE SWEEPED AREA

Fully 300,000 acres of forest has been burned and the public has lost timber having an approximate value of not less than a million dollars. The dead trees stand for a time after a fire, then are blown down and furnish fuel for additional fires, which finally wipe out all tree growth.

in contrast to the present progressive devastation.

There is but little land suited to agriculture. There are a few farm homesteads, but so far it has been possible for homesteaders to clear and put into cultivation only slightly over 400 acres. It is believed by careful observers that there is probably not more than an aggregate of 4,000 to 5,000 acres which could be farmed. These lands occur in scattered patches. It is certain that there will be little development of them until the mines and other resources can be opened up in such a way as is possible under the National Forest system.

Not to be overlooked among the resources is the wild life which abounds in this region. Game is plentiful and there are reported to be many mountain

sheep and goats. Certainly no better fishing could be found anywhere.

Adverse public sentiment was responsible in the early days for excluding this area from the National Forests, and hence for the serious condition which has followed. Public sentiment has changed. There is now a demand among the people of Idaho that this area be made into a National Forest. The present sentiment in Idaho is well expressed by a resolution passed by the State Legislature in 1917, in which there was only one dissenting vote in each of the two Houses. The sense of the Legislature regarding the value of making this

resources for the benefit of the local residents and taxpayers; make it possible for the State to realize upon its equity in the lands by relinquishing the unsurveyed school lands (Sections 16 and 36) and selecting more valuable lands elsewhere; increase the revenues of the county and State through the receipt of 35 per cent of the gross receipts collected by the Forest Service; enlarge the power of the State to share in the benefits of the Federal aid road act; and otherwise assist in opening to development and use the vast material resources of the Thunder Mountain region."

It was affirmatively recommended in the last annual



A MOUNTAIN MEADOW

Typical scene in a mountain meadow, backed by ridges, covered with forest. This picture was taken fifteen years ago. Since then hundreds of fires have been depleting the forest resources of this region.

area a National Forest is expressed in one of the clauses of the preamble as follows:

"The inclusion of the said area within a National Forest would eliminate the annual destruction of timber by forest fires; make it possible for homestead settlers to secure title to their lands under the forest homestead act of June 11, 1906, without expense to them other than entry and final proof fees and without the necessity of awaiting public land surveys; would bring Federal aid in the construction of wagon roads, trails, bridges and telephone lines; give adequate protection to the game animals, birds and fish; establish a system of regulated range use, thus conserving and perpetuating the forage

report of the Forester that this area be comprised within the National Forest system. It would not be a great financial burden to the Nation because it would be possible to deprive from it immediately a certain revenue through the fees for grazing the number of stock which could be permitted even under present conditions, and this would go far to cover administrative costs. A great mistake was made in the first place. The consequences of that mistake are already serious. It is essential that the public take action immediately to prevent further injury and to make the area in question of public service rather than increasingly a public injury.

KILN DRYING OAK FOR VEHICLES

ONE of the distinct developments of experiments conducted at the Forest Products Laboratory at Madison, Wisconsin, during the war was a rapid method of seasoning oak.

It requires from two to three years to air season heavier oak wagon stock. Better stock has been secured by drying this heavy green oak according to Forest Service recommendations and the time for 3-inch material green from the saw is reduced to 90 or 100 days.

Three large plants using this system have negligible

losses and as compared with losses at plants using other methods, ranged from 10 per cent up to complete loss. Where there were heavy drying losses there was heavy pressure for relaxation in inspection, so that poor drying meant not only an excessive loss of stock and a holding up on deliveries but probably also poorer material in wagons.

One furniture plant with orders for spare parts that followed improper drying methods is reported to have lost \$25,000 worth of stock on one run, stock which was being depended upon to keep the force at work.



Photograph by Harris and Excog

BEAUTIFUL TREES SURROUND THE UNITED STATES CAPITOL.

Though markers and monuments of bronze and stone will doubtless be erected in many places to our heroic dead—our boys who fought and bled that Justice, Truth and Liberty might prevail in every land, they will not be all. A more significant meaning is found in the planting of Memorial Trees, standing as constant reminders to the people of America of that love of freedom, light and life for which our soldiers offered their service and their lives. And again such trees may well supplement the marble arch or monument, furnishing the needed artistic setting, a point well demonstrated by this picture of the trees around our National Capitol at Washington.

MEMORIAL TREES PLANTED FOR SOLDIERS AND SAILORS

WHATEVER memorial is erected to honor the American soldiers and sailors who gave their lives for liberty, should be, in every sense, worthy of the deeds they performed. This means, for one thing, that it should be of lasting value, just as the results of the victory they won will be an enduring blessing to the human race. It means, in the next place, that there should be about this memorial a lofty and sentimental appeal, in keeping with the principles of Justice, Truth and Liberty for which these men fought and died. In the third place, the memorial should be a living, growing monument which will increase in strength and meaning with the passing of the years and with the growing power of democracy.

What more fitting tribute, then, to America's heroes than groups and rows of trees and individual trees in their home communities. They can be planted along the streets and avenues and highways, in parks and plazas, church and school yards and home grounds and in other places. They will stand as a constant expression to the people of America of the love of freedom, light and life for which our soldiers offered their lives and their services. As they grow and expand, with their branches reaching upward toward heaven, they will speak daily of the growing and expanding life which they protect. Whatever other forms of memorial are decided on, therefore, nothing can

be more appropriate than tree planting. This is true for a number of reasons. Trees are a protection to life and innumerable are the uses to which man puts wood, ranging from the ships which cross the ocean to the house he builds over his head.

Widespread approval has been voiced of the suggestion put forth by the American Forestry Association that cities, states and communities, no matter what other memorials are erected, adopt the setting out of trees, in commemoration of those sons of whom they are so

proud. And this honor should not be confined to those who paid the supreme sacrifice. It should be made to include as far as possible all those who entered the service of their country and who stood ready to back to the limit the cause of the United States and its Allies, Governors of many states and numerous other officials, civic bodies of various kinds, women's clubs and others have expressed themselves as in hearty accord with the idea, and this backing may be counted on to push through any plans in this direction which are worked out.



Photograph by Drew-Bynum-Peters

PLANT MEMORIAL TREES FOR THREE WHO DIED IN SERVICE

Three memorial trees were dedicated Sunday afternoon at 2.30 o'clock in front of the first city playground in South Canal Street, Newark, in memory of three young men who died in the service. The three thus honored were: James V. Marzano and Oscar Sager, who made the supreme sacrifice on the battle-front, and Frederick Sauchelli, who died in the navy. The three trees bore memorial wreaths and other decorations. Mayor Gillen delivered the dedication. The exercises were under the direction of Director Joseph Esposito, who sent invitations to young men in the service, home on furlough, to assist. Music was furnished by the Police Band. (From the Call, Newark, New Jersey.)

Markers and monuments of bronze and stone doubtless will be erected in many places. This will not prevent the carrying out of the tree-planting idea. In most cases trees will serve as an artistic and needed setting to be used in conjunction with some other memorial. If an arch or building is erected, trees can be arranged

at appropriate distances around it or used along avenues and roads leading to it.

It seems, however, as if the service and the sacrifice of America's sons in this great war call for something more significant, something different from the customary



A LIVING, GROWING MEMORIAL

Walnut trees will not only furnish shade and add to the beauty of the landscape and the nation's future timber supply but to its food resources also. Planted individually along roadsides or elsewhere, or in groves, they will stand as perennial reminders of the full measure of service paid by America's sons who fell in France.

marble and bronze. There are many reasons why trees are most appropriate memorials for these men. It was the trees of France which played a large part in helping to hold and finally drive back the Hunnish hordes. France sacrificed her forests, as she did her sons, that right and justice might prevail. In this connection both the sentimental and the practical value of tree planting must be recognized, for it is helping to make up for the awful losses of devastation at the same time that it is a living, growing memorial.

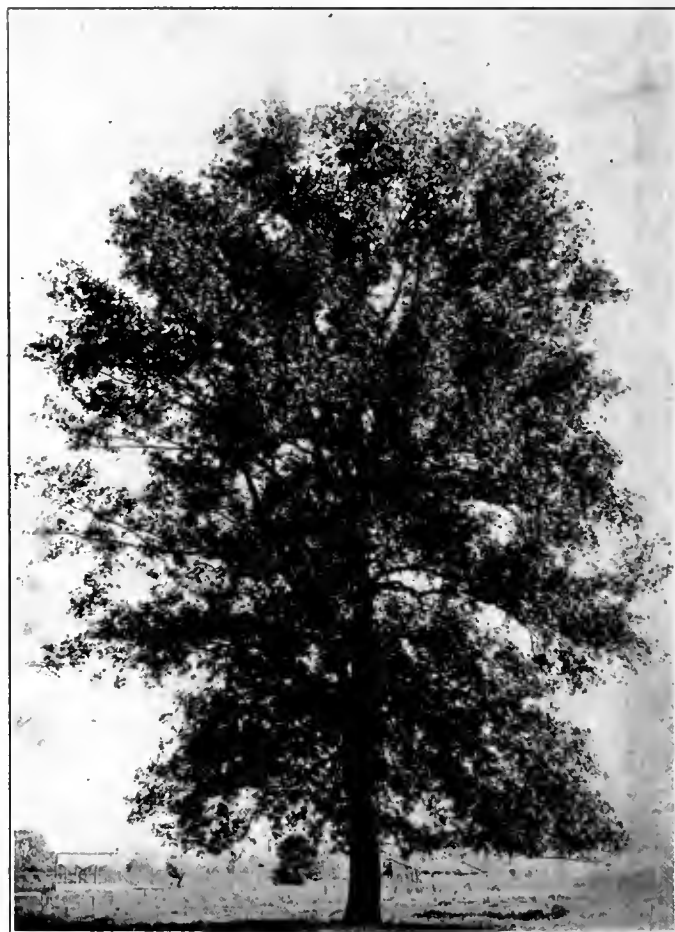
It was due to the careful planting and conservation which had been practiced by the French for many years previous to the war that, when the time came, her forests were able to supply the vast quantities of wood which was needed by the Allies for a thousand purposes. This should be a great lesson to the United States. Its forests constitute one of its greatest sources of wealth and depletion must be overcome by new planting.

The practical patriotism which is exemplified in the planting of trees as memorials is emphasized by the suggestion of Agnes Mildred Brennen, of Niagara Falls, New York, who voices the opinion that nut trees be grown, thus combining food value with that of shade, artistic beauty and future timber supply. In this connection she says:

"During the last four years more people of Europe have died of starvation than were killed in the war. We were called upon to feed the Allies, and this meant conservation of all food products. Now that peace is at

hand we are not held strictly to a limited amount of any one commodity, but we are not morally released from conserving. Europe must be fed and it is plainly our duty to furnish the food; not for a year or two but until that time when she will be able to raise her own food. The motto of the Hun was, 'Destroy Everything' and this he did most ruthlessly. We then, must adopt for our slogan the motto of the war kitchens, 'Save Everything.' We must now have our Victory Gardens and make every available piece of ground work for the cause of democracy.

"The number of our native nut trees has diminished during the past few years, while the quantity of nuts consumed has steadily increased. The war has laid waste the nut orchards of France and Italy and we can no longer import from these countries. Why then, when planting trees in commemoration of the deeds of our heroes, would it not be wise to plant a goodly number of those trees which will not only serve as a fitting memorial to our honored dead, but also furnish food for



THE BITTERNUT HICKORY

This beautiful tree grows throughout the United States all the way from the Canadian border to Florida. It is one of a number of varieties. According to the American Forestry Association there are no hickories growing in a state of nature outside of North America.

suffering humanity? It is unnecessary to elucidate upon the value of nuts as food, which well understood by the majority of people and is constantly becoming recognized by the people in general. Most nut trees require less care than ordinary fruit trees and are longer lived.

"When you plant another tree, why not plant an English Walnut Tree?" Luther Burbank says, then besides sentiment and shade and leaves, you have a perennial supply of nuts, the improved kind of which furnish the most delicious, nutritious and healthful food which has ever been known."

The oak, "symbol of strength," is suggested by the North Carolina Geological and Economic Survey, which in a statement commenting on the memorial tree plan says:

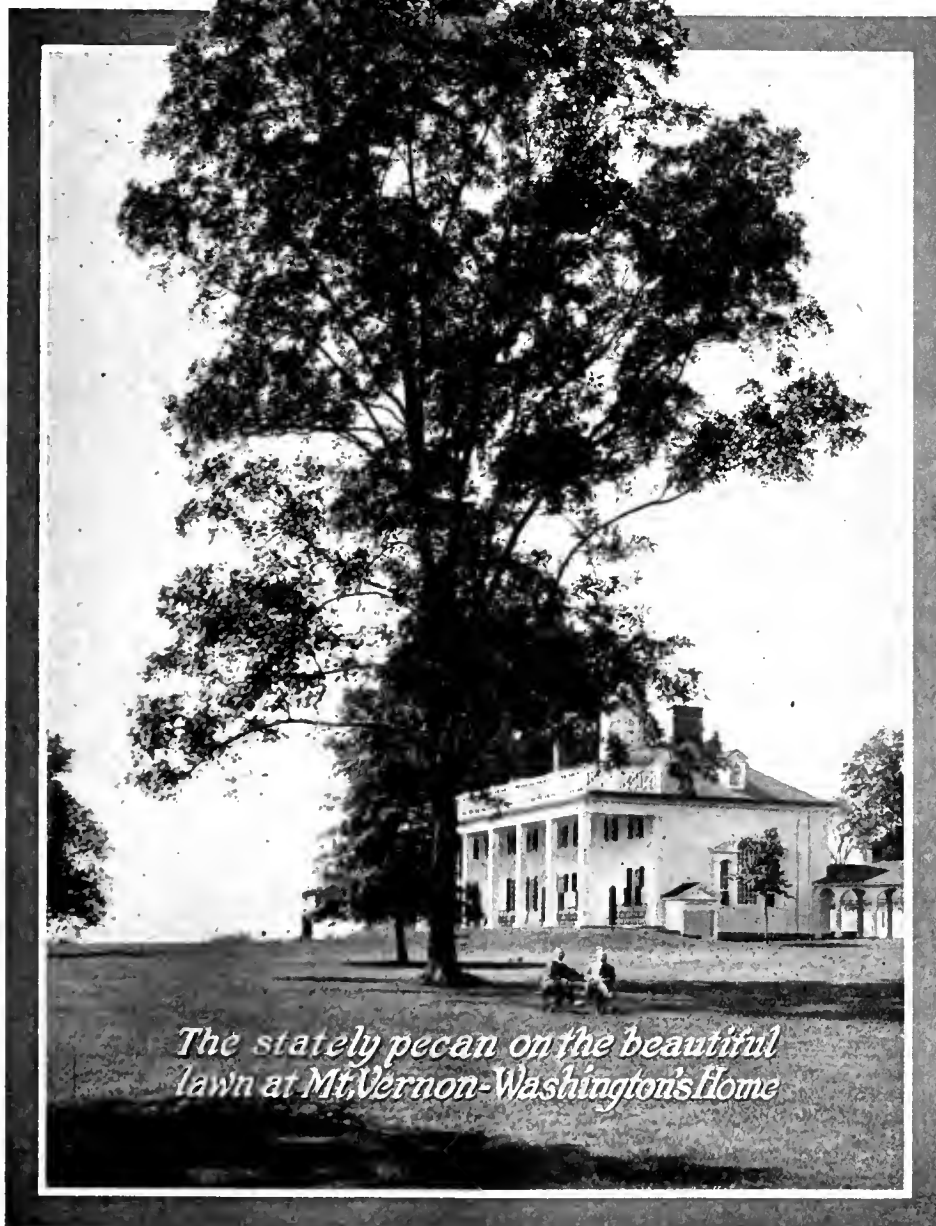
"What more fitting memorials could there be than trees! Not monuments in stone, never changing, indifferent alike to the seasons, and the care of loving hands; but beautiful young trees, growing ever upward and outward toward the light, like the souls of those whom we seek to commemorate and responding daily to the care bestowed upon them.

"The ideal tree for this purpose is one that will thrive in most situations, is resistant to disease, will live long, is beautiful in youth and will be still more beautiful in age. Such is our American white oak. It grows slowly, but no tree arouses such genuine admiration, affection and inspiration. Some other oaks, such as the willow oak, red oak, pin oak, live oak, and others are ideal for the different parts of North Carolina in which they are native, but the white oak thrives all over this State and in fact over practically all the eastern United States.

"Let us plant oaks, the symbol of strength—and one might almost say of immortality—as memorial trees, not only singly on school or home grounds, but in parks and more particularly in avenues along our important roads, making our ways beautiful with their living beauty and keeping alive the sacred memories of those whom we love and shall always delight to honor."

Memorial trees already have been planted in a number of communities, some by individuals, others by churches, clubs and other organizations; and plans are being made in many other places to

follow out the American Forestry Association's suggestion. It is most gratifying to note the prompt and wide response to the idea. A number of the states through their forest or their highway commissions are furthering the movement in a big way and preparing to plant entire forests, groves in the various counties and thousands of trees along the main roads. In co-operation with the American Institute of Architects, Portland, Oregon, is working out a comprehensive victory memorial project which includes beautiful parks with trees, a Liberty Temple, memorial hospital



The stately pecan on the beautiful lawn at Mt. Vernon—Washington's home

Courtesy of the Maryland Nut Nurseries

and a broad central driveway, with trees on either side and smaller roadways, leading to the State Capital, with wooded parking in other portions of the scheme.

The plan outlined for St. Louis by the local chapter of the American Institute of Architects provides for a cross-town park system, with Chateau Thierry and St.

Mihiel Parkways, Wilson, Pershing and Lafayette Circles, connecting with existing parks and making a comprehensive municipal improvement feature. It is suggested that one of the parkways be named "Argonne Forest," while a connecting plaza be named "Avenue of the 138th" in honor of the St. Louis National Guard Regiment which was in France.

Atlanta, Georgia, has selected April 6th, the anniversary of this country's entrance into the war, as the date for the planting there of trees in honor of the heroes of that city and Fulton County. The War Mothers of Atlanta have arranged for this dedication. The Atlanta Writers' Club has planned to set out a grove of trees in honor of prominent Georgia authors; and the first to be so honored is Jacques Futrelle, who was lost on the Titanic.

ing to the Association on this subject, George Bird Grinnell, of New York, approves of the idea for a memorial park or parks in Colonel Roosevelt's honor, as well as of the plan for memorial trees for soldiers and sailors.

The Pittsburgh Chamber of Commerce has adopted the idea of planting trees there for Alleghany County's soldiers and sailors who died in the war. The Elyria (Ohio) Rotary Club has decided to plant maples along the drives in the Memorial Hospital grounds, one for each native son who was killed. John Poole, president of the International Association of Rotary Clubs, speaks of the memorial trees as "living and loving tributes" to the memory of America's heroes. In Fort Wayne, Indiana, the department of public parks has purchased 150 trees for a memorial park.



Photographs by courtesy of D. N. Pomroy

THE END OF A PERFECT DAY

Beauty and the Beast have been busy filling up the baskets and sacks with walnuts and they seem to have made a very successful haul. While "Maud" will not share in the feast, there are enough of the delicious, nutritious nuts for many children to enjoy along with the little lady shown in the picture. When planting trees in honor of the nation's heroes who served or who fell in the great war, why not set out walnuts or some other equally valuable food-producing tree which will combine a practical with a sentimental value?

The tree planting day which is to be observed this spring by the Sharon Community Center, of Farmington, Iowa, is to be known as "Roosevelt Day." Thus, at the suggestion of the American Forestry Association, the man who occupied such a prominent position for having made conservation a live issue in the United States, is to be paid a tribute which would have appealed most strongly to his nature-loving heart. In many places throughout the country they are planning to honor Colonel Roosevelt's memory by tree planting. In writ-

An American elm for every Ramsey County, Minnesota, son who paid the supreme sacrifice, is to be planted in Linwood Park, St. Paul. Worcester, Massachusetts, is considering the placing of a row of trees along Green Hill Park Driveway leading out to Camp Bartlett, where the boys from that city trained in the early days of the war. Clinton, Massachusetts, is planning a park of trees in the heart of the city. At Fort Worth, Texas, the men who trained at Camp Bowie are to be remembered by trees along two avenues leading

out to the camp. The City Federation of Women's Clubs is back of this movement. There has been introduced into the legislature of South Carolina a bill providing for a park of not less than fifty acres at Columbia, the State Capital, set with appropriate trees and with a memorial hall in the center. At Metuchen, New Jersey, the board of education planted a Douglas spruce in the school grounds to keep green the memory of that town's sons who served.

Mrs. William T. Igleheart reports from Evansville, Indiana, that they are planning to make the tree planting day there "a victory occasion."

And in Collamer, Indiana, the *whole* town helped in

mony. Everyone—young and old, after the tree had been set in place, took one of the spades and deposited some dirt around the roots. The spades which were borne by a Boy Scout and a Camp Fire girl were decorated with small American flags.

The first part of the services were held in the village school. There a report was made on each individual soldier from Collamer, as to the time he entered the service, his duties, location at that time and anything he might have said about the service and his home while away. This recital was made by some member of his family, father or mother, brother or sister, or by a friend. There was also a short dedicatory address by



THE MEMORIAL TREE PLANTING AT COLLAMER

The town of Collamer, Indiana, with 200 inhabitants planting a tree in honor of its eighteen sons who served in the war. Recital of the service of each man was made by some relative or friend. A Boy Scout and a Camp Fire Girl each had a spade with which each person present threw some dirt around the roots. The man inside the fence (side view) is A. R. Fleck, County Superintendent of Schools; the man next to the Boy Scout is Rev. Cyrus Fleck and woman at extreme left in front of the woman with baby in arms is Mrs. Oca Jellison, Principal of the school.

the planting of memorial trees. If the service had been held in a great cathedral or if there had been 100,000 people present, it could not have been more impressive and more patriotic in character than when the two hundred inhabitants of Collamer, Indiana, gathered to do honor to the eighteen sons of that town who were serving in the great war.

The tree planting, reported by M. L. Galbreath to AMERICAN FORESTRY, was in many ways unique and of permanent record. Collamer is in the home county of Vice-President Marshall.

Every person present took an active part in the cere-

A. R. Fleck, county superintendent, explanatory remarks by Mrs. Oca Jellison, principal of the school whose husband was then in action in France, and prayer by Rev. Cyrus Fleck. Then the audience marched outside and formed a hollow square around the fence inside of which the tree had been placed and as each one passed inside he or she took one of the spades and placed a spadeful of dirt around the tree. Prayer and the singing of America closed the exercises.

Through memorial trees growing in their honor America's worthy sons will live again through the years to come.

IN THE FURROWS OF FREEDOM

BY CHARLES LATHROP PACK

PRESIDENT, NATIONAL WAR GARDEN COMMISSION

A NATION is as strong as its homes. The purposes of the various community efforts, which today are occupying the thought of many leaders in civic betterment work, is to knit together and make more secure the home ties.

The greatest of all community efforts is that of home food production. The garden is the cement which helps to hold in place the foundation of the home. There is scarcely a city or a town in the United States where the question of bringing the producer and the consumer closer together has not been discussed and where some sort of

plan has not been devised for bringing this about. But the method which has accomplished the most and which has proved most successful is that of the home and community garden. No other instruments have been found so helpful to the individual, the unit of community life.

"We Americans ought to be a nation of gardeners," says W. E. Babb, a Chicago newspaper man and apartment-house "cliff-dweller" who cultivated a garden last year for the first time in his life and found it not only profitable from

an economic point of view but interesting and educational as well. "Nature intended that we should be a nation of

gardeners," he adds, "and this applies to the man in the city as well as to the rural districts."

He tells how after clearing all the "weeds, tin cans and brick-bats from the vacant lot which he 'borrowed,' and

digging up a carload of junk," he succeeded in raising "enough to supply a score of people with vegetables all summer, while in addition my wife canned a lot for winter use."

"And there was something more," he declares. "I learned that vegetables are interesting things to live with. I tried raising chickens once and got a lot of real pleasure out

of it but it didn't compare with the joy and knowledge I got out of my war garden." He was awarded the first

prize by the State Council of Defense for his war garden.

Many thousands of other people have learned that war gardening is not only valuable but interesting. City officials and business men have learned that it is a movement worth cultivating permanently. That is why, in addition to their knowledge of the present world need for food, they are backing the Victory Garden campaign this year. The community

with the largest number of gardens in proportion to its population, other things being equal, is the most pros-

THE DAYLIGHT SAVING LAW

Here is the Daylight Saving Law which was in effect in 1918 and will remain in force during 1919, and which will settle the minds of doubters as to whether daylight saving is a one-year proposition or not:

"That at 2 o'clock ante-meridian of the last Sunday in March of each year the standard time of each zone shall be advanced one hour, and at 2 o'clock ante-meridian of the last Sunday in October each year the standard time of each zone shall, by the retarding one, be returned to the astronomical time of the degree of longitude governing each zone, respectively."



CABBAGES AND KINGS

When a factory worker has a garden like this with the best of vegetables right at the kitchen door he can feel as independent as an American citizen should feel. This is a corner in the one-acre garden of an employe of Eastman Kodak Company at Rochester, New York.



Photograph, Bureau of Agriculture, Philippine Islands
EGGPLANT AND LOMBOY

This is one corner of a vegetable garden at Singalong, Manila, where the home food production campaign has borne fruit.

community welfare schemes. This includes the planting of gardens. All these forces realize the binding strength of the home. Love of home reflects love of country and inspires the spirit that produces real patriotism. Lincoln said: "Let not him who is homeless pull down the house of another, but let him labor diligently to build one for himself."

America, the land of homes; America, the land of gardens! That is a "consummation devoutly to be wished," a goal worth striving for. The nearer we come to that aim, the richer in things spiritual as well as physical will be the nation.

Large industrial concerns which have encouraged and assisted their employes to plant gardens and to raise part of their own food testify to the value of the work as a stabilizer of labor and as making more contented and better workmen and citizens. The National War Garden Commission has received numerous reports which bear out this statement. Here, for instance, is what is said



WAR GARDEN WHERE FIRST ALFALEA IN UNITED STATES WAS GROWN

Lorenzo S. Clark, of Salt Lake City, answered the call of Pershing to "Keep the Food Coming" by planting a war garden on land where his father, in 1853, with seeds brought from England, planted the first alfalfa in this country. Under the direction of Walter J. Sloan, supervisor of city war gardens, Salt Lake City in 1918 planted more than 8,000 home food producing plots and raised \$750,000 worth of its own food. Mr. Sloan reports to the National War Garden Commission that they are planning for an even bigger campaign for Victory Gardens in 1919. He says: "There will be need for an additional food supply for years. The people of the United States, at least a majority of them, are just beginning to learn what it means to raise their own vegetables. I believe that it would be to their benefit, war or no war, if we could instill into the minds of the American people this thought—No unsightly back yards, no vacant lots. Weeds are a menace to health, so are empty cans and garbage in your back yard. We want health."

perous and the best community. One has only to look at value figures of what some of the cities raised last year, running into many thousands and in numerous cases into the hundreds of thousands of dollars, to realize what this movement means.

Closely connected with this home food production effort is the big "own-a-home" campaign which is being conducted this year throughout the nation. This is being stimulated by the United States Department of Labor, the National Federation of Construction Industries, real estate boards and chambers of commerce and various other organizations which have at heart the lasting betterment of the people. The Council of National Defense is now utilizing the vast machinery which it built up to help organize the nation for the pressing business of war, and turning it into the channels of peace and working out



A COMMUNITY GARDEN GROUP

Here are a few of the thousands of home food producers of Louisville, Kentucky, who have made a wonderful record.

of the movement by the Norton Company of Worcester, Massachusetts, whose employes last year cultivated 100 acres of company land on which they raised between \$40,000 and \$50,000 worth of food, in addition to that which more than 2,000 workers grew in their home gardens:

"The Norton Community Shop gardening activities are no longer an experiment. On the contrary they are an unqualified success, and the Norton Agricultural Society is looked upon by the company and its employes as a permanent institution. Many who have never handled the spading fork and the hoe are becoming enthusiastic amateur gardeners. Far from turning a good workman into a poor farmer, one of the most important results of the Norton garden activities has been the making of good workmen into better workmen. The procession of men who at the end of a summer afternoon in the shop tramp over the hill to enjoy an hour of vigorous exercise out of doors is matched the following morning

by the returning ranks of clear-eyed, vigorous men ready to engage with equal enthusiasm in the regular vocational work which they have chosen. The harvest time, which brings to the man the tangible evidence of what intelligent effort, persistence and industry will produce in the garden, gives him a clear realization that the exercise of the same qualities in the shop is as certain to bring its reward.

Better still, as the officers of the company and its men busy themselves in their gardens side by side, there arises the spirit of comradeship among all who embark together on some great adventure."

This idea is spreading around the world and other nations are coming to the United States to learn of the benefits which have come to this country as a result of the

community and shop garden movement. The inhabitants of the Philippines have entered into this work with an enthusiastic determination to improve their own condition at the same time that they are performing a broad



LOOK WHAT TRENTON DID

Some of the finest war gardens in the United States were in the capital of New Jersey, where the Trenton Food Garden Commission was active in keeping up interest in home food growing. Is this not a wonderful improvement on an ash-covered lot?



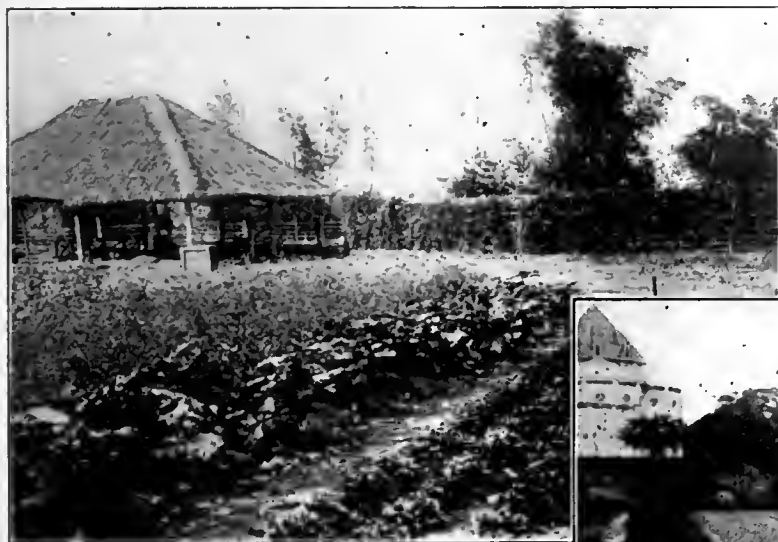
GAVE UP GOLF FOR GARDENING

That is what W. E. Nemts, assistant general claims agent of the Chicago Surface Lines, did when he saw the need of raising food for the boys "over there." His report to the National War Garden Commission of Washington shows that although he had never done any gardening before he made a fine record. Individuals and communities everywhere are planning to make the Victory Garden Campaign this year a bigger success than was the war garden campaign last year.

humanitarian service. A report to the National War Garden Commission from the Secretary of Agriculture of the Philippines tells something of the way in which they are planting gardens there. This work has been well-organized and is being stimulated through district and municipal campaigns so that everybody is reached and encouraged to help in the food production effort. Demonstration gardens are being planted throughout the Island in the public squares and plazas of the different municipalities to serve as a standing call to the Filipino peoples to help in the world food war. The instance is cited of a fourth grade school boy in one of the islands in the Philippines who has taught a big lesson in food production to the natives of the whole island. He entered the contest which was held there and was given a

but it is because of the beautiful flowers and landscape effects for which they are famous not because of the vegetables which they grow.

The Victory Garden campaign in the United States this year is in full swing and, in the widespread interest shown and the number of gardens planted, bids fair to surpass the wonderful work done in 1918. Hundreds of organizations which were active in the movement last year are again in the field, while new ones are taking up the slogan of "Food F. O. B. the Kitchen Door," and urging everybody to get into the furrows of freedom to drive back the new enemy, General Hunger. Manufacturing concerns have prepared to assist their employes again this year by providing land for them to cultivate. There is increased interest among railroad employes in the work. State and city officials and garden committees are busy. Banks and libraries will assist again by the distribution to their patrons of thousands of garden books furnished them by the Commission. The newspapers of the country again are backing the movement and lending it their hearty support. Big campaigns are on in many cities and motion pictures are being used to show what the "city farmers"

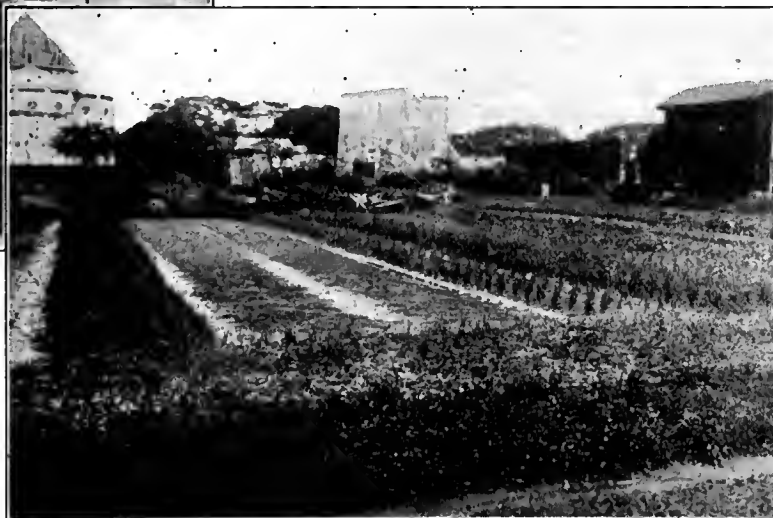


WHAT THEY'RE DOING IN THE PHILIPPINES

Lettuce and eggplant are some of the specialties they raise in their gardens at Singalong, Manila.

small piece of land to cultivate. On it he raised a variety of vegetables. He was told, however, that it would not be possible for him to grow a second crop of corn, as it never had been done, and that the weather and other conditions would not permit. But he did grow a second crop of corn and it was larger than his first crop. In this way he converted the sceptics to the possibility and the value of rotation.

The Japanese Government is studying the methods which have been carried out successfully in this country by the National War Garden Commission. S. S. Honda, trade commissioner of Japan and an official in the Department of Agriculture, who was recently in the United States, took back with him to Japan all the information he could gather about home and community food production, with the purpose of organizing a similar campaign in his country. In discussing the subject he said that a survey of idle land was then being made and that his people, who knew virtually nothing about home gardening, would be urged to cultivate all the land available. Japan, of course, prides itself upon its gardens, he said,



Photographs, Bureau of Agriculture, Philippine Islands
AT CALLE TAFT, MANILA

Everybody is a victory gardener in the Philippines and they are rounding up the "slacker land" even under the shadow of the cathedral dome.

can do. As an illustration of what they are doing in some of the cities, here is what C. E. Smith, garden director of the Detroit Department of Parks and Boulevards, says in a letter to the Commission:

"The work for the present year is well on its way and we are anticipating a much bigger and better work than the year previous. With a large number of gardeners already enrolled with us and the present amount of available land for garden purposes more than double that of last year, we feel assured that the victory gardening for this year will be well worth the most strenuous efforts." In Detroit they are using the Commission's posters on the street cars, particularly to call the attention of the factory workers to the need of home food produc-

tion. Advertising clubs are assisting and here is the text of a resolution adopted at a recent meeting of the Advertising Club of Washington:

KNOWING THAT the production of food is the paramount problem before the world today, and

KNOWING THAT the President of the United States has called upon us to help feed the people in the stricken areas of Europe, and

KNOWING THAT everything possible must be done to produce food as close to the place of consumption as possible; therefore, be it

Resolved by the Advertising Club of Washington, That its members co-operate with the National War Garden Commission in its campaign for Victory Gardens by using window displays and garden copy wherever possible in order to carry the message of Food F. O. B. the Kitchen Door to the people, and be it further

Resolved, That we urge the Associated Advertising Clubs of the world to co-operate and that this resolution be sent to them.

The opening of the home garden drive this year and every succeeding year should be celebrated by a national holiday. It is a new independence day for the nation; and the home soldiers of the soil should have some-

way of expressing the freedom which they have found in the garden. Of course, there is no fixed first planting day throughout the United States or even throughout a restricted territory; but some day might be fixed which would answer the purpose of calling attention in a nation-wide way to this great institution—the home and community garden. Pageants and parades can be arranged in the various cities.

On the last Sunday in March the Daylight Saving Law goes into effect again, just in time to give the victory gardener the advantage of the extra hour of daylight



A CLEAN LOOKING PATCH

Pupils of the Tondo intermediate school at Manila are taught gardening, as is shown by this picture, and they are teaching their elders much about the work.

Photographs, Bureau of Agriculture, Philippine Islands
IN A PHILIPPINE GARDEN

The message of "Food F. O. B. the Kitchen Door" has spread to the lands beyond the sea; and the Filipino wards of Uncle Sam are doing fine work in home and community gardening.

every afternoon which meant so much to him last year and which meant the addition of millions of dollars to the nation's garden products.

Are you going to have a part in the harvest of victory? Will you help to conquer the new enemy, Hunger, which is killing thousands of people in lands across the seas? If you have not yet planted a Victory Garden, plan to do it today.

PHILIP W. AYRES ELECTED PRESIDENT OF THE APPALACHIAN MOUNTAIN CLUB

FOR the first time in its history, the Appalachian Mountain Club has chosen a member of the forestry profession to lead it. At the recent meeting of the club, Philip W. Ayres, who has for years accomplished notable things for forestry in the State of New Hampshire, and who is the Forester of the Society for the Protection of New Hampshire Forests was elected President.

The members number over 2,000. There are well-developed chapters of the club in New York City and in Worcester, Massachusetts, while the general membership is more widely extended, including several members in Washington, District of Columbia. Its honorary and corresponding members include the distinguished mountaineers of Europe and America.

The club has eleven forest reservations in New Hampshire, varying in size from 1 to 300 acres, besides three reservations in Massachusetts and two in Maine. It maintains 54 paths in the White Mountains covering 213 miles. It maintains three huts of a capacity of 35 to 40 each in the highest parts of the White Mountains, besides nine other camps and various other shelters at high elevations above 3,000 feet and some of them above 4,000 feet, throughout the mountains. All of these are as freely open to the tramping public as to club members. The club is actively co-operating with the supervisor of the White Mountain National Forest in the matter of trails, telephone lines and fire lines.

THE USES OF WOOD

FENCING MATERIALS FROM FORESTS

BY HU MAXWELL

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

THE forests have fenced American farms, orchards and yards. Much material other than wood is in use, and was used in the past, and doubtless will be in the future; but wood has held first place from the earliest times, and it is not inclined to yield that place now. It has been abundant and relatively cheap in many parts of the country, and in most ways has been satis-

the land in the process of clearing. Such a fence was a continuous windrow of brush extending round the field. The building of one of that sort was like killing two birds with one stone; for the removal of the brush cleared the land, and when properly piled, the brush constituted the fence. Such a fence answered most purposes when freshly built, but it soon decayed, and then



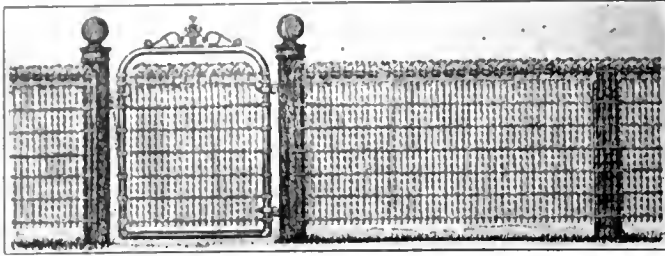
Courtesy of "The White Pine Bureau"

WHITE PINE GATES OF QUALITY

An attractive gate gives class to premises and furnishes an introduction which never fails to impress favorably those who see it for the first time. Architects and landscape gardeners understand how to make the most of this asset. In this respect, wood seems more genuine than metal. This is the gate at famous "Beverly" on the Pocomoke River, Maryland.

factory. The kinds of fences built of wood, or partly of wood, have been numerous and interesting, and fashion has been regulated largely by convenience. The first fence that encloses a newly-cleared field in a forested region may not be the same in style, appearance, and construction as that enclosing the meadow which occupies the same site a century later. The original fence may have consisted of brush, limbs, and poles procured from

it settled so low that horses, cattle, and sheep could walk over it at will and thus enter and depart from enclosures. The brush fence never was much protection against hogs, for these animals were able to force passage through and under, and a short period of decay put such a structure out of commission. The brush fence used to be common and it has not yet become obsolete. It was never regarded as a wholly creditable farm improve-



RAILING AND POSTS OF WOOD

Fences of metal, in rods, bars, or wire, are frequently held up by posts and rails of wood. It is difficult to find a substitute for wood at reasonable cost. Wooden posts may be given preservative treatment to prolong their period of usefulness and to increase value. This is now done on a large scale.

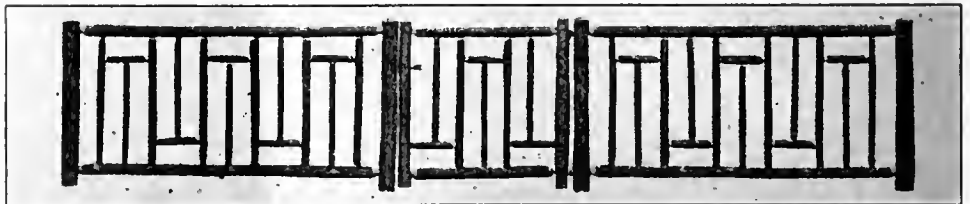
ment, but rather as a makeshift for temporary service only.

The log fence, or that made of logs, poles, and brush in combination, was formerly more common than it is now. It differed only slightly from the common brush fence. It might last a year or two longer if the destroying agent was decay alone. It was often easier to roll logs, trunks, and branches together and build a fence of them to enclose a field than to bring them together in heaps and rid the ground of their presence by burning. A week of constant attention might be necessary to rid the ground of a group of log heaps by burning, but when rolled to the margin to form a fence, the logs were out of the way. Some fences were built of stumps pulled from the ground and their roots all turned in one direction. Such were more common in northern pine regions than elsewhere, because pine stumps are easily pulled from the ground and they retain their roots many years. A structure like that is sometimes known as a Canada fence because common in the pine regions of Canada.

The fence rail was the ever-present

and all-important unit of fencing material. It still occupies a conspicuous place, but has lost some of its popularity. The rail is split from timber, and the regulation length is eleven feet, but variations in length are many. Rail-splitting was a common occupation in early times. Farmers mauled the rails with which they enclosed their fields. The splitting was done with mauls, iron wedges, and wooden gluts; and a strong, industrious man, when he had good timber already cut into suitable lengths, could split 400 or 500 rails a day. Champions had records as high as 1,000 rails a day; but such a number was impossible except under the most favorable circumstances. The rail fence is usually constructed with zig-zag panels, the pattern being known as a "worm" fence or "Virginia" fence, the first name being due to the resemblance of the line to the path of a crawling worm.

Rails have varied much in size, according to timber



ORNAMENTAL RATHER THAN USEFUL

Rustic fences are built in many styles, but most of them are intended to be ornamental. In most instances other kinds of fence could be built for less money, but cheapness is not the main purpose held in view by builders of fences of this kind. The rustic fence is often ready made in factories.

and region. During the Civil War, lines of walnut fence in Indiana were purchased by gunstock manufacturers, and it is said that those rails averaged the equivalent of fifteen board feet per rail. A mile of that fence represented enough

timber to saw 75,000 feet of boards. The staked and ridged fence required a little more. Enormous quantities of timber have been mauled into rails in some of the forested regions, where wood was cheap, fields small and farms numerous. The West Virginia Conservation Commission estimated that, from the earliest settlement



IS THIS TOO GOOD FOR FENCES?

They figure that enough wood is in these two cars of logs to make two-thirds of a mile of plank fence, but that the lumber will be of a grade too good for fencing. That is a matter on which opinions may differ. The best white pine of New England was not considered too good for fencing. These logs are Douglas fir.

of that State down to the year 1900, no less than 4,500,000,000 feet of timber had been split into fence rails.

Most of it was oak and chestnut, but some was yellow poplar, black walnut, white pine, white ash, and slippery elm. Worm fences are still being built, but they are disappearing in favor of wire and boards, or of straight fences constructed of rails and posts. The post-and-rail fence has been considered

ends were fitted in holes mortised in posts set ten feet apart. Such fences ran in straight lines. It was a little cheaper than the worm fence if timber had any value. It required about 55,000 feet of timber to make a mile. The plank fence uses sawed lumber instead of flat rails, and nails are the fastenings instead of mortises and tenons as in the post-and-rail pattern. A plank fence may be built with from 30,000 to 40,000

feet of lumber per mile, including the posts. There is another pattern of rail fence much used on very steep



WORM FENCES ENCLOSING MOUNTAIN FIELDS

A few long lines of fence like this may still be seen in mountainous regions where timber has only recently become salable, and was formerly maulled into rails. Replacements are now made with posts and planks or posts and wire. This fence is in Tucker County, West Virginia.



HOW A "SWEDE FENCE" BRISTLES

Such fences are constructed up and down steep hills where the ordinary worm fence will not stick to the ground. This one defies the worst farm rogues, having been modeled after an old military device constructed to stop cavalry. This fence is on a farm among the Allegheny mountains.

as the connecting link between the pioneer worm fence and the plank fence. It was once made of flat rails whose

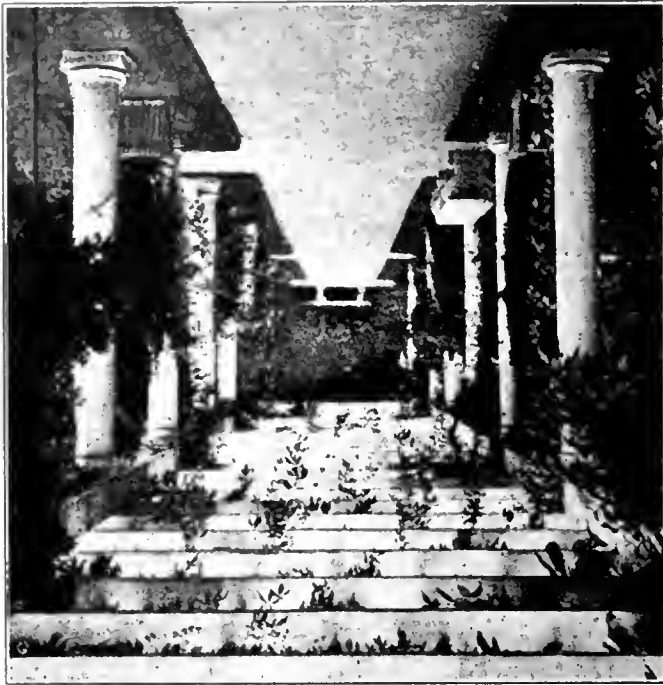


Courtesy of "The White Pine Bureau" FINE AND FAULTLESS AFTER A CENTURY

The white pine palings enclosing the famous Spaulding House at Nashua, New Hampshire, show few signs of deterioration after a long period of exposure to the weather. The fence has received care and has been kept well painted. Neglect is the greatest enemy of out-of-door woodwork.

ground where the common worm fence will not stand. It is known as a "swede" fence, so named from its resemblance to an old military contrivance built of spikes called "swedish feathers," and intended to check attacks of cavalry. In building the swede fence one end of the rail rests on the ground while the other end is elevated at an angle of thirty or forty degrees and is supported on stakes which cross each other like the letter X.

Various patterns of paling and picket fences are in use, in some of which the pickets are held by nails, in



Photograph by Courtesy of the Hartmann-Sanders Company

THE PERGOLA'S FINISHING TOUCHES

Happy surroundings tend to convert idle moments into years of pleasant memories and the pergola has helped transform many barren spaces into spots of charm and beauty.

others they are woven with wire; and in a few of the old cypress picket fences of the South, wooden pegs were used in place of nails. In some instances it has been found that the peg was the better fastener, for it remained sound after nails of the same age had been destroyed by rust. The picket fence involves a catch problem in geometry which some of the old-time pedagogues thought quite interesting, and they liked to put it up to their advanced pupils thus: "Prove that more pickets are required for a mile of fence on level ground than for a mile up and down hills." The pupil who could prove the positive side of the proposition and round out his reasoning with the formal and classic *quod erat demonstrandum*, always received one hundred per cent in his grade in mathematics.

Every species of wood in the United States which attains sufficient size, has done service as fence rails, either after being split or in the form of round poles; but not one species in twenty is satisfactory for split rails, crude and common as such rails are. A wood has generally been considered defective as a fence rail prospect unless it could be split easily and was resistant to

decay. Relatively few woods possess both of these qualities in the desired degree.

It is not practicable to make a list of rail timbers to include all the good and exclude all the bad. It depends largely upon the region. Where white oak and chestnut were plentiful, rail splitters used few others in former times; but some regions had neither of these. Black walnut was more durable than oak or chestnut, but its range was limited to certain districts, and chiefly to rich land; consequently, only here and there were walnut fences possible. Yellow poplar splits well, but it is brittle, breaks easily, and is prone to decay when exposed to the weather, and its use as rails was restricted by a prejudice against it even in regions where trees were plentiful and of splendid size. Many pine rails were made formerly, and a few are still made, but unless the sapwood is excluded, the pine rail rots quickly. White ash splits in a beautiful manner, and before the wood became valuable in a commercial way, much splendid ash timber was mauled into rails. All cedar with highly colored heartwood makes good fence rails; but only a few cedars are large enough for splitting, after the sapwood has been excluded; and some cedar splits none too well. Millions of rails were made of southern red cedar, and trainloads of such rails were brought up many years



CATALPA FOR FENCE POSTS

This cut shows a small catalpa tree just attaining size fitting it for fence posts. It is one of the handsomest trees of our forests and its large leaves and showy flowers cause it to be planted oftener for ornament than for posts. However, it serves both purposes well, and is widely used.

later to be made into lead pencils. On the northern Pacific coast the giant red cedar contributed rails for many a mile of fence. In California a similar service was exacted of the incense cedar; but the rail fence was never as popular in the far west as it was in the eastern country in early times. The westerners preferred to use

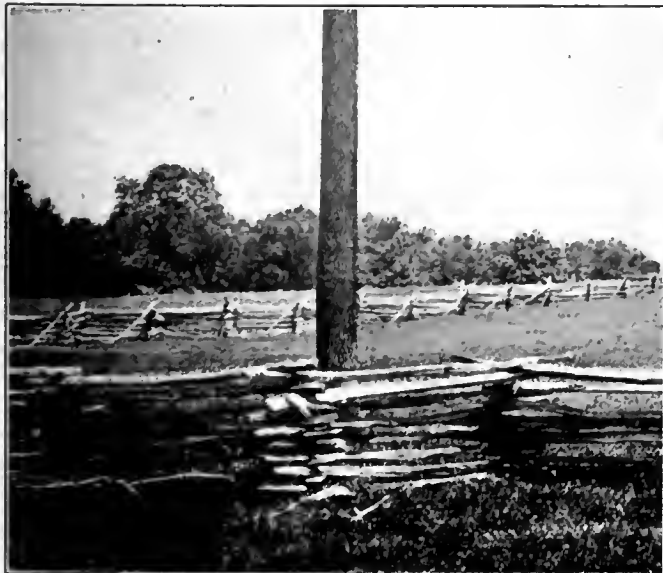


OSAGE ORANGE FENCE POSTS IN KANSAS

These posts were cut from planted timber, for Osage orange is not a native tree in Kansas. It once formed hundreds of miles of hedge fence in the treeless states, and now some of these hedges are being cut for fence posts, having reached that size because they were not kept cut back.

the incense cedar for posts and finish the fence with lumber cut from yellow and sugar pines or from redwood. Southern cypress possesses the essential qualities required of good rail timber, and much of it was once put to that use.

Nearly any wood may occasionally be made into rails, either because it is convenient, or because no better is in reach. One rather abundant tree is never worked into rails, because it is unworkable. It is black gum which



RAMSHACKLE RAIL FENCES

Unless rail fences are kept in repair, they are not things of beauty and may soon cease to be things of utility. There are reasons to feel thankful that old style rail fences are passing out of use. They are wasteful of both wood and ground. This is a scene in southern Indiana.

cannot be split unless solidly frozen. Old rail splitters always liked to initiate a novice by assigning him a black gum log to split, and then joshing him on the subject of his speed.

The best trees were always selected by rail makers (speaking in the past tense) because such were more easily split than those that were crooked and knotty. The result was, in pioneer times, that the very finest oak, chestnut, ash, and walnut were cut for rail fence material.

Enormous numbers of fence posts are now in use and have long been in demand. The chief quality of posts must be durability. They are always in contact with the ground, and at the point of contact decay is active. For that reason it is necessary to select the more durable woods for posts if long service is wanted. Probably half



UNUSUAL BUT EXCELLENT FENCE MATERIAL

These uncouth specimens, which might be mistaken for vegetable porcupines, are tree yuccas growing on the Lincoln National Forest, in New Mexico. Stockmen use the dead and dry trunks in making corral fences. The logs are set on end in the ground, forming palisades which answer the purpose well in regions where other timber is scarce. Photograph by the United States Forest Service.

of the fence posts in use are neither sawed nor split. They are round poles, sometimes with the bark still on, but commonly peeled. It is not so essential with posts as with rails that the wood split readily, though trees more than six or eight inches in diameter are generally sawed or split before being set as posts.

Trees of every species, if large enough, may be used for posts; but some of them decay so quickly that they are scarcely worth the trouble of setting. A post that does not last five or six years is unprofitable. A split or sawed post usually lasts longer than one of the same wood in the round, because the round post is apt to con-

tain a higher proportion of sapwood than the sawed post, and the larger the proportion of heartwood the longer the post will likely last. Every forested region has certain woods more durable than others, and these are preferred for fence posts. The following woods are regarded as good post material in regions where they can be had:

Yellow or black locust occurs in the middle Appalachian region. This tree's range has been widely extended by planting.

Incense cedar and redwood abound in California and in southern Oregon. The posts are always sawed or split from large trees and the sapwood is rejected.

Osage orange or bois d'arc grows in Texas and Oklahoma. The sap is very thin, round posts are not objectionable, and those sawed or split are not often seen.

Chestnut ranges from Connecticut to Georgia, and the posts are sawed, split, or round.

White oaks of more than a dozen species are made into posts in practically all parts of the United States. The posts are nearly always sawed or split.

Black walnut heartwood is very durable, but the sapwood is nearly worthless for posts. Black walnut was

never largely used for posts.

Mulberry heartwood is durable and posts from large trunks last well, but the trees are not abundant.

Mesquite and several other leguminous species of the Southwest have thin sapwood, very durable heart, and make good posts, though the boles and branches are usually very crooked.

Southern red and white cedars, and northern white cedar or arborvitae, are extensively used for posts and are shipped far from the region where they grow.

Catalpa lasts well, and since most catalpa posts are cut from planted trees, the range of

this wood covers most states in the Mississippi Valley, and also in other regions. The principal original range of catalpa was restricted to the lower Ohio Valley.

The question as to what wood is most durable as fence posts has not been decided. Both the wood and the situation must be taken into consideration. Locust and Osage orange are rivals for first place, if situations are the same; while in the dry climate of California, incense cedar and redwood last a long time. In the southern country they have called cypress the "wood eternal," under the assumption that decay has little effect upon it. It lasts a long time, but not forever.

The practice of treating fence posts with preservatives to hinder decay has become extensive and is on the in-



IDEAL TREE FOR RAIL SPLITTERS

Millions of fence rails have been mauged from such oaks as this. The pioneer fence builder picked the largest, finest trees because of the ease with which they could be split and of the symmetrical rails produced. Heartwood was wanted, and large trunks contained relatively more of it than small.



VIRGINIA RED CEDAR

This tree is known as the Virginia red cedar, but at the present time more of it is cut for posts in Texas than in Virginia. It grows in all southern states, and in Tennessee much of it was formerly split for fence rails, but it is no longer used in that way. Few woods resist decay better than this cedar.

crease. By such treatment, some woods which are not naturally durable may be converted into long-lasting posts.

It has been said that America has used more wood for fences than for houses, and the statement is probably true. Wooden fences are peculiarly liable to destruction by decay, fire and flood; and they must be repaired or renewed often. They can have little protection against weather. Paint is occasionally applied, but not often. They are in contact with grass, weeds, and leaves, all of which promote decay. Fires were more destructive in the past than at present, but even yet much fencing is consumed in grass and forest fires.

No one can name a maximum, minimum, or average period of service for a wooden fence. So many influences and accidents must be taken into account that one case is not like any other. A fence of round buckeye poles among the Allegheny mountains has been known to rot down in a single year; and a similar fence of red alder on the Pacific coast may be useless through decay in a time equally short. On some of the high and dry ridges of western Maryland and the adjoining parts of Pennsylvania, farmers point with pride to worm fences of chestnut rails and claim that their grandfathers built them nearly a century ago. Old-fashioned doctors

of that region formerly made a rheumatism remedy which is not listed in the dispensaries. It was distilled from the moss-covered chestnut rails, the oldest and dryest that could be found. The wood was hogged with an ax, placed beneath a bottom-up kettle that had a fire built on top, and in that manner the oil was roasted out of the chestnut wood. "A teacup of chestnut rail oil, well rubbed in" was declared to be a cure for any case of rheumatism that was curable. The only interesting point in the prescription is that the fence rail must be a hundred years old. Some of the cypress paling fences in the southern states, and the white pine palings in the North, are reputed to be a hundred years old. Ordinarily a chestnut or oak rail fence needs a good deal of repairing at the end of fifteen or twenty years, and in less time if the fence is permitted to be overgrown with brush, as the custom is with untidy farmers.

Fences have never been the product of factories, except to a very limited extent. It has always been the custom to procure the raw material, haul it to the desired place, and build the fence in situ. That has held true whether it was a rail fence, or one of planks and posts, pickets, or posts and wire. Occasionally, the raw material grows on the ground to be enclosed by the fence. That was usually the case in pioneer days when the clearing of the land was the heavy job and the building of the fence a side issue. In more recent times fences have usually



PRIME NORTHERN WHITE PINE

Thousands of miles of plank fence in the northern states from Maine to Minnesota have been built of white pine boards cut from trees as faultless as that in the accompanying illustration; but at the present time timber of that class is seldom used for fencing boards because it is more valuable for other purposes.



SOUTHERN WHITE CEDAR

All cedar is classed as good fence post material because of its durability when in contact with the ground. The cedar shown in the cut ranges from New Jersey to Florida, near the coast, often in very wet situations such as the Dismal Swamp in Virginia. Enormous quantities of posts of this wood are used yearly.

been made of materials brought wholly from a distance.

Gates and some kinds of fencing are now the product of factories. Such factories are often located near large mills or in lumber centers. Several articles are included in the output, among them being gates, ready to hang in place; pickets ready for nailing up, or already made into panels suitable for fastening in place; woven fencing consisting of slats attached to strands of wire. The gates are of various patterns, fitted for different service. Some are small and intended for dooryards, others are farm gates for fields. The slat-and-wire fence is sold in large rolls or spools for convenience in hauling and handling.

The industry which turns out fencing and gates as here described, is small in comparison with some of the other wood-using industries, yet the annual total of wood



TYPICAL OLD STYLE RAIL FENCE

This "worm fence" is an old timer. It is a survival from past generations, and except in a few regions only a few of them are left. The fence here shown has probably stood more than fifty years. When it finally disappears, it will be replaced with a fence of posts and wire or posts and boards.

consumed in the United States exceeds 23,000,000 feet. The principal gate and fence woods, and the yearly demand for each are here given:

| | FEET |
|--------------------------|------------|
| Yellow pine..... | 6,765,000 |
| Hemlock..... | 5,152,000 |
| Chestnut..... | 5,121,000 |
| White pine..... | 3,883,000 |
| Oak..... | 2,640,000 |
| Spruce..... | 1,070,000 |
| Douglas fir..... | 805,000 |
| Cypress..... | 681,040 |
| Cedar..... | 465,500 |
| Birch..... | 300,000 |
| Elm..... | 155,000 |
| Maple..... | 140,000 |
| Redwood..... | 133,000 |
| Basswood..... | 50,000 |
| Larch..... | 48,000 |
| Western Yellow Pine..... | 33,000 |
| Yellow poplar..... | 5,000 |
| Hickory..... | 600 |
| Total..... | 27,448,840 |

The manufacturing of this material is not evenly distributed over the country. Thirty-four states produce none. Most of the manufacturing is confined to states listed below, with the yearly output of fencing and gates:

| | FEET |
|-------------------|-----------|
| Virginia..... | 6,925,000 |
| Minnesota..... | 4,570,000 |
| Iowa..... | 950,000 |
| New York..... | 725,000 |
| Washington..... | 320,000 |
| Indiana..... | 176,000 |
| Pennsylvania..... | 161,000 |

More disputes, controversies, and quarrels have been caused by fences and lack of fences than by any other one cause during

the whole journey of man from savagery up to the present hour. Even Homer, ancient as he was, based poetic similes and other figures of rhetoric, upon farmers scrapping over their line fences. Early laws in all countries were passed for the purpose of regulating boundaries, landmarks, and fences. Every state in this country has its laws on the subject. One of the first matters which statutes seek to settle is the definition of a "lawful fence"—how high it must be, and of what materials and construction. If roguish cattle break through or jump over a lawful fence,



PROSPECTIVE POST TIMBER RUINED

the owner of the stock is liable for damages. If land is not enclosed with a lawful fence, the owner of the land may be stopped from collecting damage for trespass. However the same laws do not hold everywhere. In some states "every man's line is his fence," and he need not build any fence except for his own convenience, and he can claim damages for trespass. Some laws fix the height of a lawful fence and specify the material of which it shall be built. There is wisdom in the old adage: "Good fences make good neighbors," the meaning being that community quarrels are reduced to a minimum if all the fences are in first-class order.

Here is a young locust tree being devoured by borers. That fate is overtaking millions of locust trees in the United States. Large and small alike fall victims to these insects. No protection against the attacks is known, and when an attack is once made on a tree it is done for, though it may fight many years against its fate.

THE WATERFOWL

(Family Anatidae)

BY A. A. ALLEN, PH.D.

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

TO ONE who is fond of nature in her wilder moods, there is nothing more fascinating than the flight of the waterfowl. Seen against a leaden sky or against the first flush of dawn, the sweep of their rapidly moving forms holds a charm that can be replaced by nothing else. The eye follows until as merest specks, they disappear into the haze, leaving one with a feeling that nature is not yet vanquished, that there are still great spaces

imprecation from many, will still find a joyful response in the men who go down after ducks.

Let us, therefore, wisely conserve what we have, and as the number of hunters increases, let the open season be shortened and the bag limit lowered. Let us propagate waterfowl in captivity with which to restock the marshes so that our children's children may still view the picture that made its appeal to our forefathers and to us.

There are over 200 species of waterfowl of which about fifty are found in North America. They are grouped into five sub-families or groups that are rather easily distinguished: the swans, the geese, the mergansers, the dabbling ducks, and the diving ducks. The swans have much longer necks than the other waterfowl, even longer than their bodies. The geese have shorter necks than the swans but longer than the ducks. The mer-

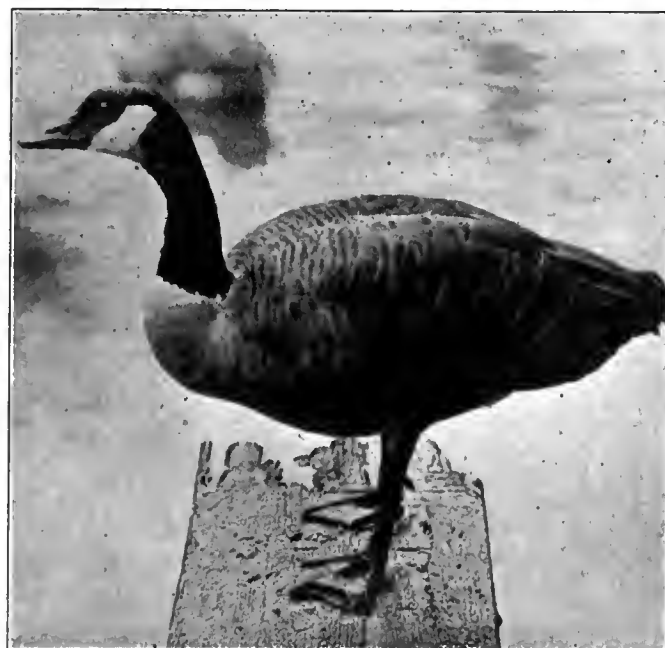


A MALLARD DUCK IN ITS NEST IN CAPTIVITY

Compare this bird with the drake mallard in breeding plumage and in "eclipse."

unexplored, that man, after all, is but one small part of the great creation.

Vast stretches of brown marsh, or waves lapping on the lake shore, or surf pounding on the headlands are the setting for a picture that clings to one's memory: there are decoys tossing on the waves, mere blocks of wood carved and painted to resemble ducks; crystals of snow driven before the blast cut and sting the face; frozen spray covers the blind and the hunters that lie in wait; Aeolus plays a tune in the gun barrels. The uninitiated wonder how men can endure such privations in the name of sport but they have not seen the picture, nor heard the music of the wind, and the waves, and the whistling wings. For nature has ordained that man shall not lose his primitive hunting instinct nor his love of primeval conditions that bring him close to her bosom. No matter how civilized the world may become nor how crowded her thoroughfares, the freezing winds, and the waves, and the ice and the snow that bring an



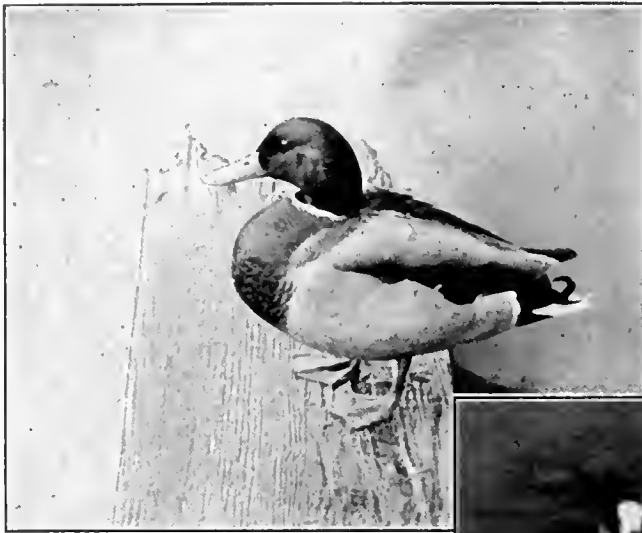
A CANADA GOOSE

Geese have longer necks than the ducks but shorter necks than the swans. This is the commonest species.

gansers differ from all the others in having narrow, serrate bills. The dabbling and diving ducks are readily distinguished from the swans, geese and mergansers but are not so easily separated from one another, unless one can observe their method of feeding or distinguish the lobe on the hind toe which characterizes the diving ducks. The dabbling ducks frequent the marshes and lake shores where they can feed in shallow water by tipping. They feed mostly at night or on dark days and spend the bright days at a safe distance from land. They usually occur in small flocks, those of over a hundred

being rare and those of from five to twenty much more numerous. They migrate earlier than the diving ducks, most of them having left the Northern States by the time the ponds and marshes have frozen. They winter from North Carolina to the Gulf and some species go as far as northern South America. The dabbling ducks are likewise called river ducks and summer ducks.

The diving ducks, sea ducks or winter ducks, on the other hand, often occur in flocks of several thousand and



THE PROGENITOR OF OUR DOMESTIC DUCKS—A WILD MALLARD DRAKE IN BREEDING PLUMAGE

All the breeds of domestic ducks except the muscovy are thought to be descended from this bird. (The photographs of ducks on the plank are of wild birds in captivity.)

feed in deep water, often far from land, for they dive readily and secure their food of molluscs, or the roots and buds of aquatic plants in water up to 100 or 150 feet deep. They are not influenced by the freezing of the marshes and shallow water, therefore, and migrate later in the fall and winter further north than the others. They are less exposed than the dabbling ducks to enemies while feeding and, therefore, feed more during the day than at night. They are better adapted for diving than the dabblers, having larger feet, stockier bodies, shorter necks and shorter wings, characteristics which enable one, when familiar with them, to distinguish the two groups of ducks on the wing at a considerable distance. On the water, the diving ducks rest lower and do not hold their tails so high from the water as do the dabblers.

THE SWANS

Of the eight species of swans, there are two found in North America. Both species are pure white, except for the black bill and feet and a yellow spot between the eye and bill that distinguishes the whistling swan from the trumpeter. Both resemble very closely the domesticated swan of ornamental ponds which has been derived from the European mute swan and which can always be identified by the hump or knob on its bill. The trumpeter swan

is today one of the rarest of North American birds if, indeed, it is not extinct in the wild state. A few individuals are still living in captivity. The whistling swan still holds its own in a few places, now that it is protected by law, and every winter large flocks congregate on Currituck Sound and a few other good feeding areas. In summer the whistling swan retires to the barren grounds to breed where it is said to be very conspicuous on its nest but it is able to defend itself against all enemies up to the size of a fox.

Swans are noisy birds and when feeding or disporting themselves, their loud clarion-like notes can sometimes be heard for several miles. They can swim very rapidly and outdistance a man rowing a boat so that they do not take wing unless hard pressed. On the wing swans are easily distinguished by their large size, long necks and pure white plumage, not even the flight feathers being dark.

THE GEESE

Of the twenty-five species of geese in the world, eight are found in North America, of which the Canada goose is the most abundant and best known. Canada geese nest from northern United States northward to the limit of trees and winter from the Great Lakes southward to the Gulf. Their comings and goings are the most conspicuous bird migrations that we have. We hear their loud honking long before we see them as they travel high over head in a great wedge or Y led probably by an old gander. They migrate both by day



A CANADA GOOSE FEEDING IN SHALLOW WATER



THE MALLARD DRAKE IN "ECLIPSE PLUMAGE"

The plumage is worn during July and August while the flight feathers are being replaced. It corresponds to the winter plumage of other birds.

and by night and sometimes on foggy nights apparently get lost and are attracted by the city lights and swing low over the house tops honking loud enough to waken even the most torpid.

On their migrations they are great vegetarians and are fond of grazing on the young wheat both in the spring and in the fall. In the south on their wintering grounds,

however, they seem to prefer to feed in the shallow water of the bays and lagoons, tipping for aquatic plants and animals.

Geese are said to mate for life and, certainly in captivity, it is difficult to get old birds that have lost their mates to make another choice. The male goose is a dutiful husband and assists his spouse in hatching the

goose, is likewise found in parts of the West. In Alaska there is another species, the Emperor goose, which rarely comes south into the United States. It has a white head and tail and a bluish gray body more or less speckled with white. The chin and throat are dark, a constant difference from the rare blue goose which otherwise is a similar looking bird of eastern North America. The breeding range of the blue goose in northern Canada is unknown, but it winters in Louisiana. The white-fronted goose is very similar to the European Gray-lag goose, and therefore to our domestic geese which have been derived from it, with the exception that the region around the base of the bill is white in the native species.

THE MERGANSERS

The mergansers, sheldrakes, saw-bills, or fish ducks as they are variously known, form a very distinct group of waterfowl, easily distinguished by their narrow serrate bills and their crested heads. Three of the nine species are found in North America but because of their fishy diet, they are nowhere valued as food. Individuals of the two smaller species, the hooded and red-breasted mergansers, however, are often eaten and pronounced as good as many of the true ducks. The females of all three species are grayish birds with conspicuously crested, reddish-brown heads, the



FEMALE PINTAIL

The female does not change her color during the molt. Here she has lost her flight feathers.

eggs and caring for the young. Both sexes are able to deliver severe blows with their wings which are armed with bony knobs at the first joint and they are, therefore, far from helpless even when they have shed all of their wing feathers and are unable to fly.

The Canada goose differs from the other species in having broad triangular patches of white on the cheeks which meet on the throat. The Hutchins, white-cheeked, and cackling geese are western representatives of the Canada goose. The two species of brant are similar to the Canada geese in having the head and neck black and the body grayish brown but the white is confined to a few white streaks forming a collar on the neck. They are considerably smaller and are confined largely to the sea coast, the black brant to the Pacific coast and the common brant to the Atlantic. The snow geese are easily recognized because they are pure white except for their black flight feathers and a grayish patch in the wing. The eastern greater snow goose is larger than the western lesser snow goose. A still smaller and rarer species, the Ross snow



MALE PINTAIL IN BREEDING PLUMAGE

The long neck of the dabbling ducks is greatly accentuated in the pintail.



MALE PINTAIL IN "ECLIPSE" PLUMAGE

This plumage is worn only while the flight feathers are being replaced instead of all winter as with most birds.

crest of the small hooded merganser being the largest. The males are conspicuously marked black and white birds, the male hooded being one of the most ornate of the waterfowl. Mergansers secure their food by diving and pursuing their prey beneath the water using only

their feet for propulsion. They first locate their prey by lowering their heads as they swim until their eyes are beneath the surface film and their serrate bills, with the hook-like nail at the tip, are well adapted for holding the slippery fish. Very often the gulls hover over the spot where the mergansers are fishing and swoop down on them when they come up with a fish. Before the poor birds can get a chance to juggle the fish about and swallow it, they are sometimes so annoyed by the gulls that they drop it and then the gulls promptly fall upon it and begin quarreling among themselves. Mergansers nest either in holes in trees or in crevices in the rocks and, like the other ducks, lay whitish, unspotted eggs.

THE DABBLING DUCKS

All of the domestic ducks and most of the ducks that are commonly known, belong to this group. Indeed all of the breeds of domestic ducks from the white Pekins to the Indian runners, with the exception of the muscovy, are thought to be descended from one species, the mallard or common wild duck, which is a typical member of this group. The muscovy is a very distinct species native to the West Indies and northern South America. The wild mallard differs but little in coloration from the domestic breed, the males having bright green heads and white rings around their necks and the females being uniformly streaked yellowish or grayish brown. Under domestication, however, the birds change considerably, becoming much heavier, with fatter heads and sagging bodies. In the wild state the mallard is found all over the Northern Hemisphere, though in North America, it is more abundant in the West and in the Mississippi Valley than in the East. Here its place is filled by the black duck or black mallard, as it is sometimes called, a wavier species that is better able to take care of itself in more closely settled districts. Male and female black ducks are alike except for their bills which in the males are yellow and in the females

olive. They are uniformly brownish black except for the purple patches and the snowy white lining of the wings. Both the black and mallard ducks feed to a considerable extent in the grain fields in the northern states, spending the day out at sea or on the larger bodies of water and feeding only at night. They are likewise residents of the marshes and it is here that they are most successfully hunted.

Space permits only a mention of the remaining dabbling ducks of which there are nine other species found in North America. The best known of these are the pintail, the baldpate, the shoveller, the gadwall, the blue-winged

and green-winged Teals, and the wood duck, the last being the most brilliantly colored of all. Its crested purplish green head, variously marked with white, its purplish chestnut breast and its buffy flanks all tend to make it a striking bird much desired on ornamental ponds. The males of the other species are quite beautifully marked in their breeding plumages with whites, browns, blues, and metallic colors but the females are uniformly plain.

The fall plumage of the male birds which is donned in late summer and worn for only a short time while the flight feathers are being replaced, resembles that of the females which is the same throughout the year. This early fall plumage of the males, which is never worn all winter as with most birds, is called the "eclipse" plumage. It serves to make the birds less conspicuous while they are replacing their flight feathers and are therefore comparatively helpless, for unlike most birds the ducks shed all these feathers simultaneously and are without the power of flight for four or five weeks until the new ones are grown.

With the exception of the wood duck, all the dabbling ducks regularly nest on the ground, usually near water but sometimes a half a mile from it and in quite exposed situations. The nests are crude affairs of grasses and weeds but as incubation proceeds, the female plucks down from her breast with which she covers the eggs to



FEMALE PINTAILS GETTING AWAY

Typical Dabbling ducks with longer necks, longer wings and more slender bodies than the divers. Compare with the scaup ducks.



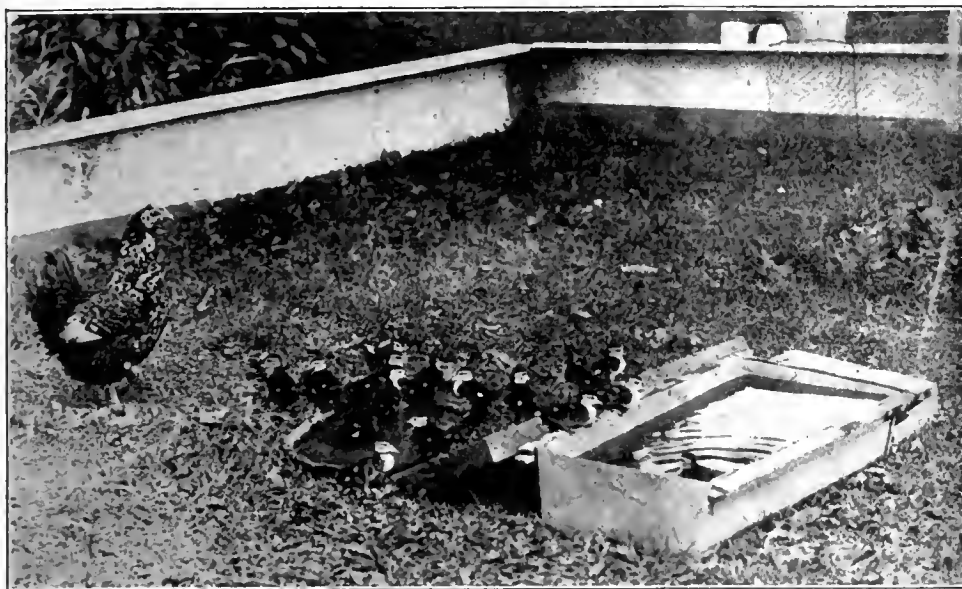
MALE GREEN-WINGED TEAL

The teal are the smallest of the ducks.



FEMALE GREEN WINGED TEAL

The bright colors are restricted to the male ducks.



A FOSTER MOTHER AND HER BROOD OF YOUNG WOOD DUCKS

The wood duck has become rare over most of its extensive range but will probably not become exterminated as it is protected by law and can now be reared successfully in captivity.

make them inconspicuous and to keep them warm while she leaves them to feed. For the males never assist in household cares, but, as soon as the eggs are laid, congregate in flocks by themselves and show no further interest. The wood duck is a notable exception for, in the first place it nests in a hole in a tree and in the second place the male attends the female and sometimes assists in incubation and such care as the young receive.

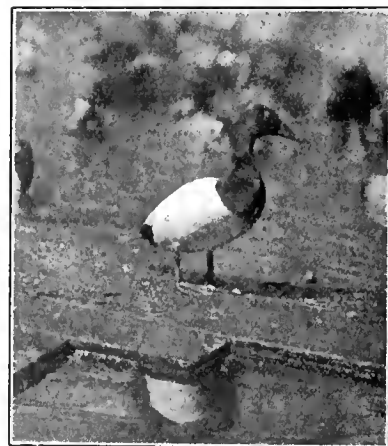
The wood duck has always been much in demand because of its bright colors and since

cies are the most abundant of our ducks, flocks of several thousand scaup ducks, for example, being a not uncommon sight on our larger bodies of water. The diving ability of these ducks can scarcely be exaggerated for some members of the sub-family, notably the old squaws, are repeatedly captured in gill nets set for fish in from 100 to 150 feet of water. Indeed, almost every year in the Great Lakes, thousands of these ducks become entangled in the nets and are drowned. The old squaws, scoters and eiders are believed to use their wings as well as their feet in diving, but the rest use

nately it is now quite easily reared in captivity and is, therefore, in no danger of absolute extinction.

THE DIVING DUCKS

There are seventeen species of diving ducks found in North America and some of the spe-



A MALE CANVASBACK STANDING

Note the large feet and erect posture characteristic of the diving ducks and compare with the mallards and teal.



HOW THE DABBLING DUCKS FEED

A female pintail "dabbling" in shallow water.

it is not a very wary bird, it has fallen an easy prey to gunners until it has become very rare over a large part of its extensive range. As a result, the Federal Government has now declared a closed season upon it for a term of years. Fortu-

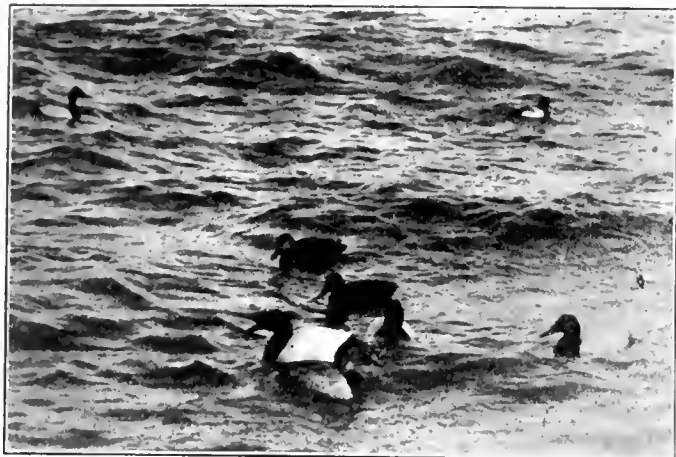


Photograph by F. Overton

A FEW SCAUPS DUCKS, OR BROADBILLS AS THEY ARE KNOWN ON LONG ISLAND WHERE THIS PHOTOGRAPH WAS TAKEN

The Diving ducks occur in much larger flocks than the dabbling ducks; this is but part of the flock.

only their feet which are much larger than in the dabbling ducks. Their feet are likewise set farther back so that when on land they stand more erect or rest on their breasts and walk with difficulty. In nesting they prefer the marshes so that they can slip from their nests into the water without having to walk on dry land. With the exception of the ruddy duck they are northern breed-



BLACK DUCKS WINTERING WITH CANVASBACKS ON CAYUGA

The Black ducks are dabbling ducks, the canvasbacks divers. Note that the blacks rest higher on the water and hold their tails up from the water.

ing ducks, nesting from the northern tier of states northward.

The choicest of all the diving ducks is the canvasback, so-called from the white back of the male. The back of the female is gray and the head and neck cinnamon brown instead of rufous as in the male. A somewhat similar species is the redhead whose head is brighter red and whose back is grayer, not to mention other differ-



A RED HEAD AMONG THE CANVASBACKS AND SCAUP DUCKS

The Redhead is following a female Canvasback in the center of the picture. Note the difference in profiles.

ences. The long bill and sloping profile of the canvasback is a good distinguishing mark in any plumage for it can be distinguished at a considerable distance. The reputation of the canvasback has been gained largely through its habit of feeding upon wild celery (*Valisneria*) which is believed to impart a pleasant flavor.

Other ducks of this group are the greater and lesser scaup ducks, blue bills, broad bills or black heads as they are variously called, the ring-necked duck, the curious little ruddy duck with its upturned tail, the two species of golden-eyes and the bufflehead (which nest in trees, the scoters or sea coots of three species, and the four species of eider ducks from which comes the eider down of commerce.

The Laborador duck, another of the diving group, which formerly occurred in numbers along the Atlantic coast, in winter, as far south as New Jersey, is now extinct. The last specimen of this species was taken in



SCAUP DUCK FEEDING AT THE EDGE OF THE ICE

The males have the white flanks the females the white at the base of the bill.

1871 but the cause of its extinction is not known. It is suggestive, however, of what may occur to many others of our ducks if constant watchfulness is not maintained to adjust the protective laws to any decrease that may occur. The wild fowl are a great asset to the nation and we can ill afford to lose them. We must, therefore, keep up a constant vigilance to see that our laws give them all the protection they need and that these laws are respected and enforced.



CANVASBACKS WINTERING ON CAYUGA

There are a few Scaup ducks in the background. A Canvasback in the foreground is in the act of diving.

VARIOUS PARASITIC PLANTS; WITH AN OWL STORY

BY DR. R. W. SHUFELDT

FELLOW AMERICAN ORNITHOL. UNION, ETC.

(PHOTOGRAPHS BY THE AUTHOR)

TO THOSE who chance to reside in the District of Columbia, and are familiar with the adjacent territorial regions of Virginia and Maryland, it is hardly necessary to point out that all through this part of the country winter frequently holds nearly everything in nature in a very firm grip during the entire month of March. It is quite the exception when the reverse of this happens to be the case; and, as a matter of fact, should this first lap of spring be open or hard, the state of affairs with respect to flowers and other vegetation, in localities where they are so abundant in the woods and fields in spring, summer, and autumn, is the same—they have vanished. The trees are bare; and should there be snow on the ground, the only evidences of the plant life of the previous season are, here and there, the lifeless remains of the stalks of golden-rod, burdock, turtle-head, and a few other plants. But, as in other lands, there are winters and winters, and to this Washington forms

no exception. Some are practically of spring-like mildness from beginning to end, so that when March comes around, the month really begins and ends with days like those of the middle of April.

In and around the celebrated Rock Creek Park of Washington, we may see, in a stormy March, just such scenes as we have in Figure 1; or, within the limits of the "Zoo," such a wintry one as is depicted in Figure 2. When this chances to be the kind of season that comes to pass, it is idle to think of such a thing as a botanizing trip. So we must resort to the next best thing, and go carefully over our last year's notes and photographs, selecting some interesting group or two wherewith to fill in a March story. For example, such a group may be seen in the one to which the Cancer-roots and Broom-rapes belong.

In suitable localities, the One-flowered Cancer-root may be found from Newfoundland to Virginia, thence across



WILD FOWL IN THE WASHINGTON "ZOO"

Fig. 1—Were we to leave out the little bridge and the rail fence, this wild swan and the Canada geese would make a very correct representation as to how these elegant game birds appear in their native haunts in the winter time.

the country to Texas, and westward to the Pacific coast. Usually it is found growing in damp or even wet woods, beneath the rank vegetation that most often is high above it. It is not very abundant in the neighborhood of Washington, the specimen shown in Figure 3 being the first one discovered for some years; it was found near the bank of a tiny stream that coursed through a swampy piece of woods, not far from a ford leading into Rock Creek Park. As will be noted in the illustration, this beautiful and delicate little flower tops a slender and quite naked stem. Each blossom is tubular and five-lobed,



Fig. 5—IN THIS CUT WE HAVE ANOTHER CURIOUS PLANT OF THE HEATH FAMILY, WHICH LIKEWISE HAS BEEN CALLED "PINESAP," THOUGH IT IS MORE GENERALLY KNOWN BY THE NAME OF FALSE BEECH DROPS (*Monotropa hypopitys*)

False Beech Drops, as a plant, belongs in the same genus with the Indian Pipe, notwithstanding the fact that the summit of its stem is not invariably "turned to one side."

the color being sometimes white, but most often pale violet or even purple. It possesses a faint, sweet fragrance, and to some extent this may attract the small bees that are responsible for its cross-fertilization.

This Naked Broom-rape, as it is sometimes called, is a leafless, parasitic plant that thrives upon the sap of other plants; that is to say, it is by nature parasitic—hence its lack of leaves. It rarely grows over six inches in height, and quite often several of them are found loosely bunched in a group. In Figure 3 the plants are seen to be growing near a rock, among blades of some swamp-grass; others near them grew at the foot of a beech tree.

Passing next to the Heath family, which is widely separated from the Broom-rapes, we find a remarkable as well as famous plant in the Indian Pipe, also known as Pine-sap and Ghost-plant. The group shown in Fig-

ure 4 was taken natural size, as in the case of all the other plants in this article, just as they grew in a forest of big pines and oaks. This genus has been named *Monotropa* for the reason that its flower-head turns to one side, and it only becomes erect when it goes to seed. Gray describes it briefly in the following words: "Low and fleshy herbs, tawny, reddish, or white; parasitic on roots, or growing upon decomposing vegetable matter; the clustered stems spring from a ball of matted, fibrous rootlets; furnished with scales or bracts in place of leaves; one to several flowered." The origin of the name is from the Greek. He claims that Indian Pipe is found in Mexico as well as in Asia. When picked, it soon shrivels up and turns a sooty black; while, if carried home with care, with plenty of moist, rich earth about its roots and planted in a proper environment, it will thrive

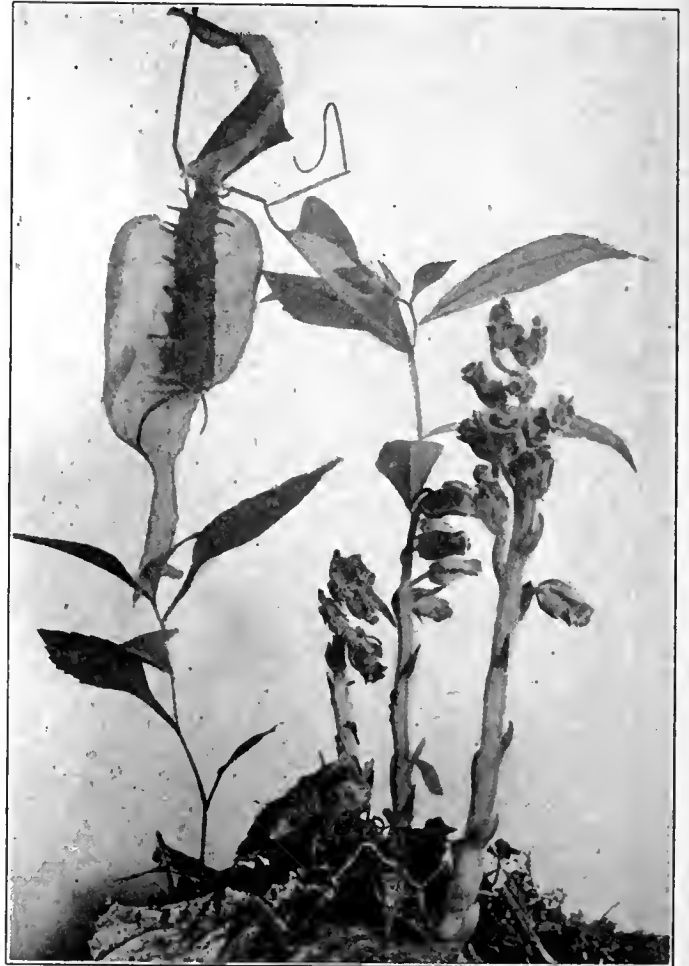


Fig. 6—THE GROUP OF FALSE BEECH DROPS HERE SHOWN IN FIGURE 5 WERE PHOTOGRAPHED IN SITU. IN THIS CUT WE HAVE ANOTHER SPECIMEN WITH THE SURROUNDINGS CLEARED AWAY, IN THAT THE PLANT MAY BE MORE SATISFACTORILY STUDIED

The remarkable caterpillar shown on the suspended leaf is the larva of the Pipevine Swallowtail Butterfly (*Papilio philenor*), a beautiful form of that famous genus.

and eventually go to seed—its life-cycle offering, upon the whole, a most interesting and instructive chapter in the study of one of the most curious growths we have in our entire flora.

Mathews says of the Indian Pipe that when it goes to seed "the enlarged ovary finally assumes an erect

position, becoming a pale, tawny salmon color; it is usually ten-grooved and five-celled, and forms a large, fleshy, ovoid seed-vessel." In favorable localities we may meet with a considerable number of Indian



Fig. 3—OUR "ONE-FLOWERED CANCER-ROOT" IS A CURIOUS PLANT AND THIS IS AN UNUSUALLY FINE SPECIMEN

The Broom-rape family (*Orchidaceae*), to which this plant belongs, is not a very extensive one; its representatives, upon the other hand, possess a special interest for us.

States botany goes, *Monotropa hypopitys*, the vernacular name for which is Pinesap or False Beech Drops.

By way of explanation, it may be said that the plant called Beech Drops or Cancer-Root, belongs in the Broom-rape family (*Orchidaceae*), in which the One-flowered Cancer-root (*O. uniflora*), described above, is found. True Beech-drops are not figured in the present article for the reason that, up to date, no specimens have been met with. As compared

Pipe plants growing in the same piece of woods. In the hilly, timbered country north of Cabin John Bridge, west of Washington, is a great place to find them along in June; while further South, as in southern Virginia, they put in an appearance much earlier.

Gray divides the genus *Monotropa* into two groups or subgenera, namely, the *Eumonotropa*, represented by the Indian Pipe, and the *Hypopitys*, created to contain, in so far as eastern United

with False Beech-drops, it is a very different appearing plant (Figs. 5 and 6).

Quoting Mathews for these Beech-drops, he tells us that it is "a parasitic plant, which draws its sustenance from the roots of the beech tree. The stem is tough, straight, almost upright-branched, stained with brown madder, and set with a few small, dry scales. The curved, tubular, dull magenta and buff-brown upper flowers are purple-striped; although generally sterile they are complete in every part, the style slightly protruding beyond, and the stamens just within the throat. The tiny lower flowers are cleistogamous—closed to outward agencies and self-fertilized. A few of the upper flowers are cross-fertilized by bees. 6-20 inches high. Beech woods, Maine, south and west to Wisconsin and Missouri. The name means *on the beech*." Related to these Beech-drops, and in the same Broom-rape family, we have still another genus of parasitic plants, also represented by a single species, known as Squaw-root or Cancer-root. This genus is *Conopholis*, and the plant referred to is *C. americana*; it



Fig. 4—HERE IS A GROUP OF INDIAN PIPE PLANTS TAKEN IN SITU, JUST AS THEY GREW IN NATURE. (*Monotropa uniflora*)

Indian Pipe is likewise called Corpse Plants and Pinesap, and some of its relatives in the Heath family (*Ericaceae*) are White Alder, Shin Leaf, Laurels, Azaleas, Cranberries, Huckleberries and a vast host of others.

The name means *on the beech*."

Related to these Beech-drops, and in the same Broom-rape family, we have still another genus of parasitic plants, also represented by a single species, known as Squaw-root or Cancer-root. This genus is *Conopholis*, and the plant referred to is *C. americana*; it

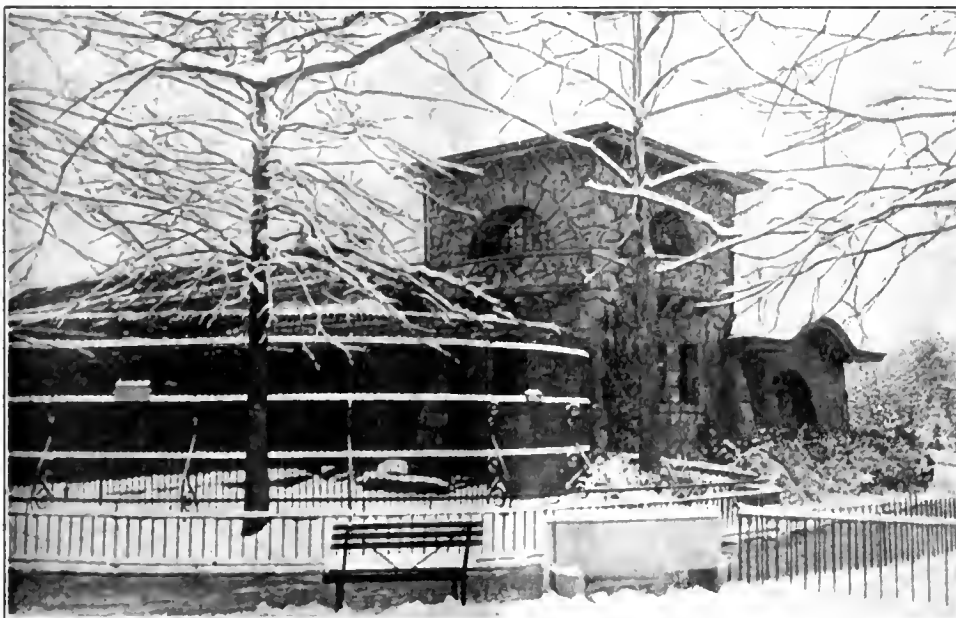


Fig. 2—THE SOUTH VIEW OF THE MAMMAL HOUSE IN THE NATIONAL "ZOO" WITH ITS LOW, SQUARE TOWER—THIS BUILDING PRESENTS A MOST ATTRACTIVE PICTURE IN WINTER DRESS.

occurs over the greater part of eastern United States. Good descriptions of it will be found in most all the works devoted to the plants of the region just named.

Dissimilar as they are in general appearance, in all the botanies we find the Spotted Wintergreen (Figure 7) placed, in classification, as a close relative of the Indian Pipe; but then, as pointed out elsewhere, the Heath family, composed as it is of both shrubs and herbs, is a very heterogenous assemblage of plants. The Spotted Wintergreen referred to, *Chimaphila maculata*, is generally found growing in dense pine woods, where, with its dark green, white-striped leaves, it is a plant sure of attracting attention. The form of the leaves, as well as the appearance of the flowers, are well shown in the accompanying illustration.

Individual plants differ with respect to the striping of the leaves, some being very strong and conspicuous, and also as to the number of flowers. Often the latter is single; but as a matter of fact, there may be as many as five on one plant. The leaves are pointed and remotely toothed along their margins; moreover, they are generally curved from stem to point, the convex surface being uppermost, which latter is quite shiny. The white striping is on the upper aspect and in the neighborhood of the ribs or veins. Pipsissiwa may attain a height of eight or nine inches, but the majority of plants met with are shorter than this. It flowers during mid-summer, and has a range over the northern tier of States to Minnesota, southward to Georgia and Mississippi. As will be noted in the cut, the stalks bearing the beautiful flowers are long, slender and generally straight; they are, too, of

a bright ruddy color. Each flower is borne at the end of a separate downward-curved stem, which is about an inch in length. Before bursting open, they are pretty little white balls, with their stems more distinctly curved downward, than they are after blooming.

A close relative of the Spotted Wintergreen is another Pipsissiwa, called Prince's Pine (*Chimaphila umbellata*); it is said to be more abundant than the Spotted form, with its leaves arranged in two whorls about the stem at

quite an interval apart. These leaves are not pointed as in *C. maculata*, but broadened at their outer ends; neither are they spotted. They are shiny and curved downwards. The flowers of this species closely resemble those of the Spotted variety, and rarely exceed five to the plant; its range is about the same.

Closely related to these *Chimaphilas* are two other genera, namely, the genus *Moncsis* and the genus *Pyrola*. In the first we have the One-flowered Pyrola (*M. uniflora*) and in the latter the Shin-leaf (*Pyrola eleiptica*). The last-named ones, says Reed, "is the most common of the Pyrolas. The evergreen leaves are bright green, obscurely toothed, broadly elliptical, and narrowing into long stems that clasp at the base. During May a long,

smooth scape springs from the middle of the group of basal leaves to a height of five or ten inches, bearing, near its top, a raceme of several flowers. It is common throughout the United States and southern Canada." Reed does not say what the flowers are like, while another author at hand says that there are from seven to fifteen of these; that they are waxy, greenish-white in color, and very fragrant. As its name indicates, the One-flowered Wintergreen or Pyrola bears but a single flower on its upright stem, which is usually about five inches in height, though frequently it is much shorter. The flower is either white or pale pink, and does not differ very widely from a Wintergreen blossom. It is waxy and has five petals, and often measures half an inch across. At first the upper end of the stem is crooked over; but after going to seed, the pod stands erect at the summit of the stem.

Sometimes it occurs growing in colonies, and is then sure of attracting attention. This is invariably in the high, dry woods of the northeastern section of the United States, westward to Minnesota, and southward to the District of Columbia. It is usually in flower along in mid-summer, and it surely is one of the prettiest little plants of our woodland flora.

Passing from flowers to Owls, attention is here invited to the Barred Owl (*Strix v. varia*) which has, for over two years, occupied a commodious cage all to himself in



Fig. 7.—IN THE HEATH FAMILY WE ALSO HAVE THE GENUS *Chimaphila*, OF WHICH THERE ARE TWO SPECIES. THE PLANT HERE SHOWN IS ONE OF THEM, ITS COMMON NAME BEING THE SPOTTED WINTERGREEN (*C. maculata*)

Chimaphila derives its name from two Greek words, which together mean to love the winter.

the Bird House in the National "Zoo" at Washington, and which has a very interesting history. At this writing he is full grown, and in very beautiful plumage, while at the time of his capture he was in the pure white, downy stage of the young of this species, and, like most young owls, a most remarkable-looking bird. It was at this stage of his growth that I penned an account of his capture, and published it in a popular journal in New England somewhere. That story was illustrated, in so far as this particular owl was concerned, by a reproduction of a photograph I made of it, which showed the attitude it assumed when asleep. This attitude is most extraordinary, as it squats



Fig. 9.—NESTLING OF THE BARRED OWL (*Strix v. varia*), A WELL KNOWN SPECIES OF THIS COUNTRY. ALTHOUGH NOW FULLY GROWN, THIS BIRD RECEIVES BOTH ROOM AND BOARD FREE FROM THE GOVERNMENT AT THE NATIONAL ZOOLOGICAL PARK AT WASHINGTON.

down upon its perch, and allows its head and neck to hang way down below it, for a distance of at least ten inches or more. There are

those who will be interested to know what this Barred Owl looked like when it first left the hollow in the tree that its parents had selected as a nesting place. This I secured a few days after it came into my possession, and a reproduction of the photograph illustrates this brief biography.

It will be of interest to know that of the large number of species of owls we have in this country, that in the case of the owlets their first plumage is almost invariably white and downy as in the case of this young Barred Owl.

CRATER LAKE SHELL HOLE

CRATER LAKE was recently most aptly described by Representative Sinnot, of Oregon, when speaking from the floor of the House as follows:

"Crater Lake, cauldron-like and circular, 7,000 feet high, is perched amid the peaks. Perpendicular sides of slaggy lava rise over a thousand feet from waters of indigo blue six miles across and 2,000 feet deep.

"To the scientist, a mighty volcano collapsed within itself, Mount Mazama, 15,000 feet high, telescoped.

"To the poet, 'the sea of silence,' 'a lake of mystery.'

"To me, a shell hole of a war of worlds—who knows?

"Could the great blind poet have seen this marvel ere his pen had Lucifer and his host of rebel angels—

Hurled headlong flaming from the ethereal sky,
With hideous ruin and combustion, down—

in Miltonic imagery here he'd have found the impact."

COPIES of the Roster of American Foresters and Lumbermen in Military Service—final publication—are available on request. This is a reprint from the November issue of AMERICAN FORESTRY, containing additions and changes received up to November 15, 1918. Address American Forestry Association, Washington, District of Columbia.

NEW ENGLAND FORESTRY CONGRESS

THE two-day session of the New England Forestry Congress held in Boston, February 24th and 25th marked the close of a period of fourteen years of development of state forestry in Massachusetts, and brought together many of the foremost foresters of the country for a general review and discussion of the place of forestry in public economy. In spite of the celebration due to the arrival of President Wilson on the 24th, the sessions were well attended and the audience followed the discussions with closest attention. Thirteen papers were given, each of which dealt with some subject of direct interest and was discussed not on the basis of theory or sentiment but from the results of experience and practical application. The first session was devoted to a consideration of the economic importance of forestry. The waterpower situation in New England and its dependence on forest protection was set forth by Henry I. Harriman, President of the Boston Chamber of Commerce. Richard T. Fisher, Director of the Harvard Forest and head of the Forest School gave an illuminating talk on "Home Grown Timber, the Hope of the Wood Using Industries of New England" in which he emphasized the facts which the average man has so far failed to grasp, namely, that it does not pay to have to ship timber 3,000 miles and pay freight charges, while at the same time the land capable of growing this timber lies idle at the factory doors. Ellwood Wilson, whose Company, the Laurentide Paper Company is spending \$100,000 per year in reforestation, set forth "The Relation of Pulp and Paper Manufacture to Forestry."

In the afternoon on Monday, while the guns were booming the salutes to the President and cheering crowds swayed round the Copley Plaza, the program of the meeting, somewhat more thinly attended, proceeded within. Dr. Metcalf, Chief of the Division of Forest Pathology of the United States Bureau of Plant Industry discussed "Fungus Diseases at Work in our Forests" and brought up to date the knowledge of the White Pine Blister Rust. E. C. Hirst, State Forester of New Hampshire, recently returned from the management of the ten sawmill units sent to Scotland, talked on "Co-operation in Forest Fire Protection." Commissioner George D. Pratt of New York gave an illustrated lecture on the work of the Conservation Commission in protecting the Adirondacks.

In the evening, at the banquet given at the Copley Plaza, Forester Henry S. Graves gave an address on "The Need of Private Forestry" which should be in the hands of every citizen. His analysis of the economic situation with which this country is faced, and the relation of private timber holdings to the problem may well serve as a basis for constructive efforts in the future.

On Tuesday, the morning session was devoted to "State Forest Policy." Dr. J. T. Rothrock, the veteran state forest commissioner of Pennsylvania, now retired, discussed the problems of re-organization now facing that department and strongly advocated the continuance

of the separate department under which the work had developed.

H. H. Chapman, Professor of Forest Management of the Yale Forest School, discussed "State Forest Policies in the United States." The principle emphasis of this discussion was laid on the necessity of maintaining separate departments of Forestry instead of effecting consolidations with other branches of state activity. Massachusetts is faced with a re-organization of this kind, and there is a serious danger that the initiative and efficiency of the work will suffer unless kept in a department free to develop and cope with the big problems which it faces. It was shown by Mr. Chapman that out of thirty states with forest organizations, fourteen had kept the work of forestry entirely independent, three more practically so by nominal connection with state land departments, six had tried combination with fish and game protection, four with state geology, two with state experiment stations and but one with State Boards of Agriculture. The effect of these combinations on forestry was in each case determined by the degree to which forestry officials were subordinated to other officials. Game wardens have almost never succeeded in developing a progressive program of forestry, no matter how well intentioned they might be. State geologists have had better success—being scientists and specialists themselves they have given the State Forester the initiative and sympathetic support needed. Foresters connected with Agricultural Experiment Stations have been free to develop forest education and demonstrations for encouragement of private forestry, for much the same reason—just as the members of a college faculty are given freedom of initiation in research.

But the one experiment in combining State forestry with agriculture in the State of Vermont proved a failure, and enabled the interests which are always seeking an opportunity to control State departments for their own ends to overturn this department, oust the State Forester, against whom not a shadow of criticism could be found, and reduce the office of Forester to that of an unimportant subordinate of the Commissioner. It was strongly urged that Massachusetts recognize the tremendous economic interests at stake—with three-fifths of the area of the State suitable chiefly for forest production—and set the work on a firm foundation by the maintenance of a separate State Forestry Department.

This view was supported by the Congress, which passed strong resolutions to that effect.

A paper was read from Dr. B. E. Fernow, the dean of American foresters, on "Forestry Policies of Foreign Countries." One of the most instructive papers was by W. R. Brown on "Results of Twenty-five Years' Clean Cutting and Selective Cutting in New England." This paper was a digest of what had actually happened following the efforts of the Berlin Mills Company to practice forestry on their holdings. Facts such as have been shown on these cuttings will be the basis of all successful

future operations in forest management, and this paper will serve as a starting point for a new era in silvicultural practice in the spruce regions.

Forrest H. Colby, Forest Commissioner of Maine, followed with a discussion on slash disposal. The final number was on the subject of "Forest Research," by Prof. J. W. Toumey, of the Yale Forest School.

The Congress passed resolutions favoring the extension of the operation of the Weeks law, the undertaking of a timber census, the extension of regulation of the management of private lands by insistence on proper fire

protection and the adoption of measures which will insure the protection of the land for timber production, the passage of a bill by Congress extending aid to forest research by States and urging the State of Massachusetts to maintain a separate State Forestry Department.

The meeting was conducted under the auspices of the Boston Chamber of Commerce and the Massachusetts Forestry Association. The proceedings will be published, and will thus be made available to foresters and the general public.

EDITORIAL

REORGANIZATION IN MASSACHUSETTS

FORESTRY in Massachusetts is facing the problem of reorganization. The Constitution provides that all of the State's activities, now numbering some 110 departments, must be reorganized into not more than 20. The wisdom of such a provision is not a subject of debate, since the matter is settled. It remains to determine what will become of State forestry in the scramble.

The answer depends upon the attitude which the people of Massachusetts take toward State forestry and their estimate of its relative importance in the general scheme of things. First, is forestry of sufficient importance in the economic welfare of the State to merit a separate organization as one of 20 departments? Second, if not, what combination will give the best results for forestry and for the public?

The handicap under which forestry as a public policy has suffered in this country is a surprising lack of foresight and comprehension of what it means in the economic life of the average man. Prices of wood products go up at a rate faster than that of other commodities, and the public grumbles and seeks for evidence of a lumber trust, when the cause lies in the denuded hills at their own doors and the freight bills on Oregon fir. Hind-sight may be better than foresight. Many a bankrupt can understand the causes for his failure after it happens. We are steadily bankrupting our forest industries and riotously expending the inheritance of nature, which we did not produce. Meanwhile there appears in our press such articles as "Timber's Horn of Plenty," in the *Literary Digest*, which lulls our senses to sleep by remarkable perversions of facts regarding the abundance of our timber supplies.

Three-fifths of the State's area unsuited for agriculture, but capable of producing 2,000,000,000 feet of timber annually, and with manufacturing industries dependent for their continuance on home-grown timber, and a lumber industry capable of employing permanently 30,000 men; with streams furnishing water power of tremendous value to her chief industries, and dependent absolutely on stream regulation through the maintenance of forest cover; with the scourge of the gypsy and brown-tail moths and the white pine blister rust calling for the united efforts of all organized forces to prevent

the complete destruction of both forest and shade trees, the State of Massachusetts still hesitates whether to put State forestry as one of her 20 departments. Yet this department is now nineteenth in point of appropriations and number of employees among the 110 branches of the present government.

Perhaps it is because the work of this department has scarcely begun, and for lack of actual demonstration of results, that the department is looked upon as a minor branch of the State's activities. In other words, foresight is to be eliminated in this reorganization of Massachusetts State Forestry, and the departments are to be crystallized in their present form.

That is just the reason above all others which demands a separate organization for State forestry. It is NOT established—the tremendous need for rapid expansion is clear to all who have true foresight. How is the average citizen ever to be brought to realize his need and to support the economic program of reforestation, fire protection and regulated timber cutting unless the State Department of Forestry is free to expand this educational work and its demonstrations of practical results? And if one thing has been clearly demonstrated in our State governments, it is the fact that when forestry departments are subordinated as a minor branch of a large organization, the scope of the forestry work becomes limited to the ideas, not of the forester, who comprehends the situation, but to some game warden, agricultural commissioner, or highway engineer, who provides first for what he does comprehend and permits forestry to gather the crumbs which fall from his table.

The future of State forestry in Massachusetts is in the balance. Pennsylvania's wonderful progress in forestry followed a reorganization which created the Department of Forestry as a separate organization in 1901. Massachusetts cannot afford to overlook the task ahead, for there will come a time when camouflage and evasion of economic facts will no longer be accepted by the citizens of the commonwealth, and they will ask, "Why are not these things done, and what has the State Forestry Department been doing to enlighten us and to protect our welfare?" The answer will be: "In 1919 the citizens

of Massachusetts did not consider the State Forestry Department of sufficient importance to stand alone and bear its own responsibility for success or failure. You placed us under another department, and we have been powerless to grow to the measure of our responsibilities. The fault rests on your shoulders."

These are the questions to be met in the next few weeks by the great and general court of Massachusetts, which is trying to reach a wise solution of her problem. May we hope that they will have foresight, and place the responsibility of the forestry program squarely on the shoulders of a separate Forestry Department.

IDAHO FOR MORE NATIONAL FORESTS

ON March 3, 1907, Congress prohibited the further creation of National Forests by Presidential Proclamation in the States of Washington, Oregon, Idaho, Montana, Wyoming, and Colorado. The late Theodore Roosevelt before signing this bill used the authority of which he was about to deprive himself in creating extensive areas of new National Forests in the six States mentioned. At the time, this action aroused tremendous protest, and was looked upon as a defiance of the wishes of Congress.

That the action of the President was in advance of public sentiment at the time no one will deny. In the State of Idaho especially a bitter antagonism existed towards the creation of National Forests, and this sentiment was actively expressed by the late Senator Heyburn. In the Thunder Mountain region of central Idaho a typical mining boom was under way, and out of deference to the wishes of the Senator and of the miners who feared Government restrictions, an area of 1,100,000 acres was omitted from the Proclamation and remained public land without National Forests, but entirely surrounded by them.

The period of 11 years which has elapsed has seen a tremendous reversal of public sentiment in every one of the above States. The Legislature of the State of Idaho has for two successive sessions passed resolutions petitioning Congress to create a National Forest out of this rejected Thunder Mountain area. In the last session both Houses of the Legislature passed this petition unanimously, while in the previous session there was but one dissenting vote in either House.

What is the reason for this change? The answer is a demonstration on the ground of the benefits of National Forest Service administration compared with the evils of unregulated use of public domain. The Thunder Mountain region has but one-half of one per cent of land fit for agriculture. Experience has abundantly demonstrated that nonagricultural timbered lands in the West are best regulated by National ownership and management under the principles adopted by the Forest Service. The Legislature of Idaho backed by all of the economic interests of the State now set forth in their memorial to Congress:

1. That fires range unchecked in this region and have destroyed 700 million feet of timber.
2. That the old roads built in the time of the boom have gone to pieces, and that for lack of transportation, and of State and local funds to develop roads, mining and water power development are impossible.
3. That wild life is being exterminated.

4. That hordes of sheep from Oregon invade this region annually, and are converting the entire area into a dust heap.

5. That no revenue whatever is being yielded by the resources of the region for the benefit of the State.

It is conspicuously true that this region whose carrying capacity for sheep is not over 75,000 is grazed by at least four times that number annually, and that local stockmen and settlers have no rights whatever. The indictment against the system of private initiative and "laissez faire" is a heavy one. What is the cure?

According to the Idaho Legislature, "Inclusion of said area within a National Forest would eliminate the annual destruction of timber by forest fire; make it possible for homestead settlers to secure titles to their lands under the Forest Homestead Act; give adequate system of regulated range use, thus conserving and perpetuating the forage resources for the benefit of the local residents and tax payers; make it possible for the State to realize its equity in the lands by relinquishing the unsurveyed school lands and selecting lands elsewhere; increase the revenue of the county and State through the receipt of 35 per cent of the gross receipts collected by the Forest Service; enlarge the power of the State to share in the benefits of the Federal Aid Road Act; and otherwise to assist in opening to development and use the vast National resources of the Thunder Mountain region."

This region on account of its inaccessibility has no value as a National Park. The surrounding area under National Forest administration has developed rapidly and the new road legislation will further stimulate this process.

The American Forestry Association has from the first stood firmly on the platform that National ownership and management of National Forests was fundamental to the welfare of Western States, and has resisted all efforts to secure support for the pernicious doctrine of dispersal and cession of these National possessions to the State. The State of Idaho is the latest convert to this doctrine, but apparently its conversion is thorough and complete.

THE Seventh Annual Meeting of the New York State Forestry Association was a most successful one and a great deal of interest was manifested in the discussion of a broad and varied program. Important addresses were delivered by Dean Hugh P. Baker, of the New York State College of Forestry at Syracuse; Prof. Ralph S. Hosmer, of the Department of Forestry at Cornell, and others.

"BIDDY", AN ORIGINAL BIRD

BY CLINTON G. ABBOTT

"BIDDY" did something no other grouse was ever known to do. This in itself is quite an achievement in an old world in which it is supposedly impossible to be original. Perhaps at some unknown time or in some obscure place, under an environment which creates a like line of bird thought, some other Bidy did what this remarkable bird has done. If so, there is no known record of it.

To relieve the suspense and start the narrative, it should be known that "Biddy" tamed herself, and thereby got into the movies. Be it further known that the proper name of the bird to which this pet name is applied is the ruffed grouse,

although incorrectly called the partridge in parts of the north woods. All of her family are beautifully marked and extremely shy woods birds, which shoot up from your feet with a rushing whirr of wings. The camouflage of her striped brown coat is protection from the keenest eyes, so that the danger of detection is slight, except during the flashing flight to greater safety.

The still and moving pictures of Bidy and the story of her unique adoption of man was told by the writer in a talk on Wild Life in the New York State Forests, at the September meeting of the New York State Forestry Association at Lake Placid Club, New York.

The appearance of this particular bird, both in the movies and in print, is due to the fact that all attempts to tame or domesticate the ruffed grouse have absolutely failed. In no recorded case have either young or adult birds shown the slightest confidence in human beings. The baby grouse hatched from eggs set under hens will almost immediately after breaking the shell dart to the nearest hiding place and remain as suspicious as though in their natural environment; while in the woods they scatter and hide completely at the first signal of danger. At such times the mother bird will flutter along in plain sight as if wounded, but after leading the enemy away from her nest or young by such tactics, suddenly takes flight and is gone. The voluntary adoption and apparent desire for human companionship by this particular bird after being raised in the woods and reaching full size, is in every way remark-



AN UNUSUAL CONVERSATION

"Biddy"—the queer little bird which, in defiance of all recorded laws of instinct and habit, sought and apparently thoroughly enjoyed the companionship of man, her hereditary enemy.

able. The story is an unusual chapter in wild life.

During the past winter, while the snow was very deep in the woods and it was very difficult for the grouse to obtain food, the men of a logging crew in the Catskills noticed that a partridge (grouse) apparently attracted by the sound of chopping, came to where they were at work and accepted crumbs from their lunch baskets. Her confidence gradually increased and she became a regular guest of the men in this particular cutting, and with her need for food satisfied still seemed to enjoy human companionship. She even became so friendly as to perch herself on sled loads of logs and ride towards camp, and upon one occasion the men even had to push her off to keep her in the woods where she was safe.

When food became bounteous, after the snow went off in the spring, it was expected of course that Bidy would return to her own kind, and be guided by the wild attributes of her nature. Strangely enough, however, she continued to appear at about the same spot in the woods, and those who had become fond of her learned that the sound of chopping or the beating of sticks together was sufficient to bring her a long distance.

Reports of this reached a local sportsman, who, by investigation, confirmed the story; and he later advised the Conservation Commission. The writer, therefore, packed up his camera and moving picture outfit, and with considerable doubt in his heart as to the outcome, visited this spot in the woods in company with his informant, one of the men who had been Bidy's friends during

the winter. He was assured that by pounding two sticks together Bidy would appear to have her photograph taken, but when no bird appeared after beating for some time he became quite skeptical of the whole story. Bidy's friend, however, kept insisting she would come if she heard them, even a long way off in the woods. He explained that it might mean a long walk, since grouse do not usually resort to flight, except to escape danger.

Finally it came to look as though the writer's doubts were justified, and the man began to fear that his pet had fallen victim to some gun or animal. They, therefore, ceased "chopping" and sat down to eat their lunch. Before they finished the woodsman suddenly said: "There she is now," and out of the bushes walked Bidy. Her mouth was open, for it was a warm day, and her whole attitude was one of weariness, for she had apparently come for a long way. But she came straight up to them, as much as to say: "Well, here I am." She refused food, so her motive was not hunger, but the desire for human companionship.



THE CONFIDENT APPROACH OF THE FRIENDLY LITTLE BIRD

Secure in her knowledge that a friend was calling, Bidy finally came, exhausted and warm, after traveling a long way—straight up to us, as if to say "Well, here I am."

The moving pictures taken by the writer show Bidy in a playful mood. She would rush up to them with feathers fluffed out, make a big show of fighting, much like a pet canary, then dart away to renew the attack. Rather rough treatment was taken in good part, and plainly understood by her as part of the game.

Thus it was that Bidy, the grouse, went into the movies, and built for herself a niche of fame in the bird kingdom of the Great North Woods.

RESEARCH WORK IN RECONSTRUCTION

A FORCE of nearly 400 employes of the United States Forest Products Laboratory is working in co-operation with the University of Wisconsin, on research work in connection with reconstruction.

The laboratory's war time achievements are unique in that practically all of them can be turned effectively to uses of peace. For example, the laboratory demonstrated the practicability of artificially drying freshly cut airplane stock, instead of storing it for a year or

more in sheds to season. At the time of the signing of the armistice, airplane stock was being dried by the laboratory method faster than was necessary to meet the demands of the manufacturers.

More than 300 kinds of the type developed by the laboratory in various parts of the country, which were used in drying airplane material, gunstocks and vehicle parts, for the use of the Government in war, can now be turned to account in the pursuit of peaceful occupations.

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

FOREST RESEARCH---IN THE WAR AND AFTER

BY EARLE H. CLAPP

ASSISTANT FORESTER, U. S. FOREST SERVICE

THE war has been full of surprises in its use of wood. The first year brought a wonderful change in the form of trench warfare, which carried with it an unprecedented demand for wood in many forms, a demand which, according to one French authority, utilized in some cases as high as a cubic meter of wood per linear meter of front. The requirements for airplanes established entirely new standards, which extended practically from the selection of the tree in the woods to the inspection of the final product in the completed plane. The commonplace wooden box assumed sufficient importance in connection with the general question of packing to warrant the formation of a special unit in the General Staff and later on in all of the bureaus of the War Department. Charcoal in many special forms, developed through the efforts of large numbers of research agencies in many countries, was a primary requisite in defensive

ties. Gradually the work has been gaining momentum. While the thought of preparation for war did not enter into it materially, the experience of the past year and a half has shown that in research the best preparation for peace may be a long step forward in effective preparation for war. A great volume of data was accumulated concerning the stand, distribution, and quality of our forests, concerning both technical and economic problems of production and manufacture, and concerning the mechanical, physical, and chemical properties of wood and how best it can be conditioned and utilized for many purposes. An organization of experts was developed which served as a splendid nucleus for a large expansion and which has supplied an invaluable background of knowledge, training, experience, and outlook.

The expert knowledge of wood and its problems gained through years of research frequently enabled the Forest



gas warfare and drew a large part of its raw material from the tropics.

Requirements for wood and wood products were subject to rapid change. Nothing was acceptable because it had been done that way before, and men who adhered slavishly to precedent were swept aside in the fiercest competition for progress and excellence the world has ever known. The demand for correct technical practice extended from the simplest uses to the most complex, from the pick handle, the wooden box, and the gunstock to the highly complicated airplane.

Some thirty years ago the Forest Service began the development of forest research as one of its earliest activi-



A METHOD OF DETERMINING THE STRENGTH OF AIRPLANE WING RIBS

An approximation of the air pressure in flight is secured by applying the load at many points by the system of levers. This method of testing has also been used to develop the strongest and lightest designs.

Service to anticipate problems long ahead of the men responsible for the utilization of results in the military departments, and the general purpose of the Service during the war has been to use its research organization to help wherever help was needed and to seek out the opportunities without waiting for formal requests. The activities of the Forest Service, first and last, dealt with practically every use of wood in modern warfare—aircraft both heavier and lighter than air and for both land and sea, wooden ships, military vehicles, boxes and crates, containers and packing in general, lumber and structural timber, offensive and defensive gas warfare, grain alcohol, acetate of lime, pulp for explosives, hardwood distillation for various purposes, wooden limbs, fiber board, wooden pipe, implement handles, rosin for shrapnel, and naval stores products, tannin, noseplugs for shells, and various pulp products.

In order that the results secured might be known and used co-operative relationships were established and maintained with practically every one of the numerous Governmental agencies which dealt with the war: In the

War Department with the General Staff, the Bureau of Aircraft Production, Ordnance Department, Quartermaster General, Surgeon General, Engineer Corps, and Panama Canal; in the Navy Department with the Bureaus of Construction and Repair, Steam Engineering, Yards and Docks, and Supplies and Purchase; with the Shipping Board, Fleet Corporation, Fuel Administration, Director General of Railroads, Advisory Commission of Aeronautics, War Industries Board, War Trade Board, with several of our Allies, and with large numbers of war manufacturers.

Advice and assistance were rendered members of these organizations on foreign and domestic timber resources, their location, quality, production, and means of increasing production, on manufacturing processes, on the strength properties of wood and physical and chemical properties, the best substitutes, methods of drying, storing, finishing, and preserving woods, preparation and review of specifications, inspection and the training of men, and finally, on various economic questions relating to the wood-producing and wood-using industries. The activities of the organization in addition included whatever field and laboratory investigations were necessary to secure basic information.

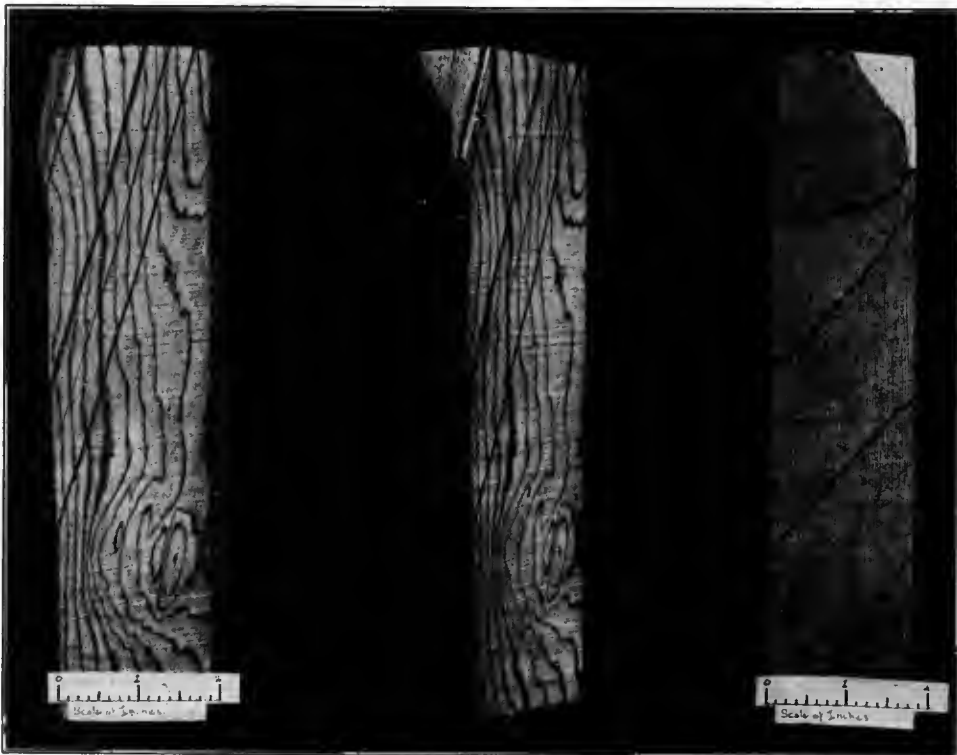
Many things have been given

the credit for winning the war—food, ships, money, and occasionally even fighting men and guns. No one questions the place of the airplane. The field was so new, the requirements so exacting, and so much was needed that the Forest Service centered its research largely on airplane problems. For the airplane the question of artificial drying of wood loomed early as one of first importance. Three-inch green spruce dries in the air in from one to two years. During our neutrality our Allies-to-be practically exhausted the reserve stock of dry Sitka spruce. Airplane authorities insisted that only air-dried stock was acceptable. The pressure of the Kaiser's armies, however, required some other answer. Forest Service kiln-drying specifications reduced the required period by

twelve times, from years to an equal number of months, and the supply of dry spruce lost its sinister place as the controlling factor in airplane construction. These specifications were based on several years' investigative work mainly on other woods and for other purposes, and they have since been checked intensively. Theoretically, properly kiln-dried material should be better than air-dried material for the simple reason that it is possible in properly regulated kilns to maintain optimum conditions throughout the entire period of seasoning, whereas air-drying permits limited regulation only. If practice sustains theory, the result becomes one of first importance. The advantage in strength and toughness per unit of weight of spruce over its best substitutes is surprisingly small; but such as it was England crossed an ocean and a continent to secure her critically-needed supply, and the United States organized for its exploitation

a body of men which in former wars would have been a large army. The work of the past year and a half has demonstrated that properly kiln-dried spruce is in fact stronger than that dried in the air even under the best conditions.

Vehicle makers in the United States before the war depended to a very large extent upon air-dried material. Specifications for escort wagons called for



CROSS GRAIN OR STRAIGHT?

Straight to any but the closest ocular inspection but shown to be worthless for airplane construction by the splitting test, the surest method of detecting cross grain in Sitka spruce. This apparently perfect piece of spruce would probably have broken in the air during the first maneuver.

stock which did not conform to the standard sizes. The accumulated air-dried material on hand was available, therefore, only in small part, and it was necessary to go back to the sawmill to secure what was needed. Oak in large sizes for vehicle manufacture seasons naturally in two or three years. Dry material had to be secured in weeks. The kiln was again the only solution. The industry, however, did not have enough kilns, did not know proper methods of drying, and did not have trained operators. Losses from poor kilns or even good kilns inefficiently operated reached from 10 to 50 and even 100 per cent. The Rock Island Arsenal Record of December 26 shows what can be done by suitable kilns operated by competent men. Spokes for 56" artillery

wheels were dried with a loss of .37 of 1 per cent, spokes for 60" wheels with a loss of .29 of 1 per cent, rims for 56" wheels with a loss of 2 per cent, and rims for 60" wheels with a loss of 1 per cent. But even more important than losses is time, and time has been reduced to one-twelfth. The type of kiln at the Rock Island Arsenal was developed at the Forest Products Laboratory, as were also the methods followed; and the man who assisted in the initial operation was a Service expert.

The drying of black walnut presented similar problems. Air-drying was the rule before the war. The demand for rifles required the use of kilns, and with the kilns came excessive losses. It is reported that one plant adhering to an imperfect schedule lost 60,000 gunstock blanks, valued at \$1.20 each when green, in a single kiln run. Concerns following closely methods developed by the Forest Service have been turning out gunstocks with losses not uncommonly less than 1 per cent.

If the war had continued the supply of naturally-seasoned willow for artificial limbs would soon have been exhausted. For air seasoning a period of three to five years is necessary. Work under way at the Forest Products Laboratory promises to reduce this period to 60 or 70 days without increase in losses.

A great volume of data on the strength of wood for practically all American species has been built up in the Forest Service during the past two decades. The number of individual tests amounted at the end of the war to no less than 300,000 and covered 130 American species. These tests were of constant and wide application during the war in airplane construction and for practically every other use where a knowledge of the strength of wood was required. For example, they permitted the preparation of tables showing strength values at 15 per cent moisture content which were adopted by both the Army and the Navy as a basis for the design of all wooden parts of aircraft. These data made it possible to select the species most suitable for airplanes and to be sure of the selection, and made it equally possible to reject unsuitable species. They showed that the variation in strength was so great as to render a considerable percentage of even the best woods unsuitable. By a density

requirement it became possible to insure the selection of the strongest stock. By the admission of specified defects in lightly stressed parts it was possible practically to double the quantity of acceptable stock without sacrificing anything in safety. The latter problem involved little more than the application of data already available and the assignment of one man for a period of about three months. Many thousand men in the woods and at the mills would have been needed to produce the same quantity of spruce.

One country lost many planes in flight because spiral-grained spruce was used in construction. Forest Service tests prevented similar losses on our part by showing where the line between straight and spiral-grained material could be drawn safely. Little was known at the beginning of the war on the strength of plywood as a material. The need for this information was supplied very rapidly by an extensive series of tests which became the basis of all of the present plywood specifications and of plywood strength factors used in airplane design

by both the Army and the Navy. In addition, the tests made it possible to adopt with safety the utilization of more species than had originally been thought suitable and thus prevented the supply of plywood from becoming, as it might easily have become, a factor controlling airplane production.

Further applications of strength data were found in the design of wing beams and wing ribs. Laminated wing beams, for example, offer the opportunity to utilize a much larger per cent of the spruce cut, a percentage far too low at the best. Special supplemental tests developed types of laminated and spliced wing beams as strong as the solid wing beam of our first planes, and the types developed have been adopted by the Army and Navy. As an example of the special supplemental tests on wing ribs may be cited those for an American combat plane produced in large numbers. The weight of the standard rib was reduced by one-third and the strength per unit of weight was increased three times. The wing so developed was adopted and similar designs were developed for six other Army and Navy planes. Strength tests had a further application in ship timber, and this and other information



Photograph by H. D. Tiemann

DRY KILNS OF THE TIEMANN TYPE

Built in the Pacific Northwest for seasoning airplane stock by the Bureau of Aircraft Production these kilns have a daily capacity of 35,000 to 40,000 board feet of wing beam stock. From some of the charges there was no degrade due to drying. Each of the 24 kilns holds 6 loads similar to those shown.

served as a basis for a comprehensive series of recommendations to the American Bureau of Shipping and the Fleet Corporation on the specifications to be followed in the selection of timber. Special tests of boxes were needed to supplement the strength tests of wood as a material. Fortunately methods and special testing equipment had been developed before the war. In some specifications which involve the construction of hundreds of thousands of boxes the number of woods permitted was increased from 1 to 30. It became possible to use the woods at hand and to make full use of the facilities of box making plants wherever they might be. In addition, nailing, strapping, and construction in general were standardized and adapted to the very severe war requirements in overseas shipments. Redesigns saved enormous quantities of cargo space. Large sums were saved in initial costs. Losses since July 1 at ports of arrival in France are reported officially to be only 15 per cent of those before July 1, and the reduction is due in part to the application of Service investigations.

Another general class of problems of first importance dealt with timber supplies and production. A general survey was made of the timber resources of the United States in order to make sure that our supplies of woods should not be dangerously reduced before provision could be made for substitutes. The best data available were maintained on requirements as compared with current production, and similar data were secured concerning the forest resources of other countries. For special woods and for special purposes, much more intensive studies were required. It was not sufficient to be able to furnish data on the properties, conditioning, and uses of wood in airplanes. If it became necessary to select substitutes for spruce knowledge as to supplies, quality, current production, and the extent to which production could be increased was necessary on those woods which from the standpoint of properties alone seemed to meet requirements. The program on airplane woods included field studies of the eastern spruce, practically equivalent to the Sitka spruce of the Northwest, and also such other possible substitutes as Port Orford cedar, Douglas fir, eastern white pine, Norway pine, western white pine, yellow poplar, western hemlock, silver, noble, white, and lowland fir, and even sugar pine, cypress, redwood, and western yellow pine. The work on eastern spruce was being followed up intensively by the Navy, but work on many of the other species was far in advance of immediate requirements.

Black walnut is the accepted gunstock wood. It had been cut heavily for years, production was not meeting requirements. It became necessary, therefore, in co-operation with the States and other forestry agencies and the Boy Scouts to make a field survey throughout practically its entire range. New sources of supply were found, new producers were interested, and processes of manufacture inspected and supervised to insure the most efficient cutting of the material; for it must be remembered that the black walnut was almost equally needed for airplane propellers. Fortunately, the requirements for these two purposes could be reconciled. Production was more than doubled; and the supply of black walnut was no longer a critical problem when the armistice was signed. Two or three years more of war might, however, have required the use of substitutes.

Demand for tonnage in the transportation of food, munitions, and armies left none for the import of tannin on which we have hitherto depended. It became necessary to increase our domestic production, and as a basis for this a field survey made by the Forest Service indicated necessary lines of action for individual plants throughout practically the entire region of tannin production.

The campaign of many agencies for increased production of wood as a fuel to relieve the coal shortage is not new to readers of AMERICAN FORESTRY. The increase in production is known to be large; and it has relieved discomfort and suffering and helped to keep up the fighting spirit at home.

Many other lines of work can only be mentioned in an article of this length. Various economic questions relating to lumber, pulp, and other important forest and wood-using industries were studied in order to keep in touch with developments in the industries, to anticipate difficulties, and to provide Government organizations with the information which they might need for administrative action. Badly needed materials, such as a satisfactory coating for airplane propellers and waterproof glues primarily for plywood, were developed, as were also methods of inspection and certification for glues in general. Material assistance was given in the technical training of men, for which always the demand far exceeded the supply.

The lessons of the war will become more and more clear as time goes on. But it is already obvious that the nation without timber is handicapped in war as it is in peace. It is hardly possible that another war will find Great Britain practically without forests, and the lesson holds true everywhere. How

greatly, for example, would it have been to the advantage of England, and incidentally to us as well, to have had on her own soil ample supplies of airplane spruce. England will now have another powerful incentive to go into the business of forestry. Obvious would have been the advantages to the United States to have had at home ample supplies of materials known to be suitable for airplane propellers rather than to be dependent, even in part, upon the tropics of Africa, Central America, and Asia.

Local as well as general timber supplies are necessary. In the congestion of our railroads almost the first commodity to suffer was wood. The farm woodlot has assumed a greater importance than ever before. It supplied material for many essential war needs. Black walnut brought as high as \$135 per thousand feet in the tree, locust for treenails \$10 per cord in the tree, and it is to be hoped that these and other wood prices have helped to make owners of woodlots realize that in the production of timber there is an opportunity for profit and service as well.

We ought to know much more definitely what our own forest resources are. In years past there have been many estimates varying in character and intensity and giving results not at all comparable. The time has now come when much more complete data under comparable plans should be secured for the entire country. It is needed in all the forest and wood-using industries as a proper basis for future plans governing their operations. It is needed to stabilize the forest industries in general. It should carry with it the collection of other data on cut-over lands, growth under present conditions and the possibilities of growth, social and labor questions, and in fact the whole range of questions necessary for the formulation of a forest policy for the Federal Government as well as for the States and private interests. We need far more knowledge as to foreign supplies, together with information as to properties and utilization and the economic and trade conditions which influence production and importation.

The war has emphasized over and over again the need for research in all lines of human endeavor. That the lesson is being heeded is shown by such great national research movements as those under way in England. With the need ahead for growing all the timber that we use, as it must be now in much of Europe, rather than depend upon virgin supplies, the technical basis must be supplied through forest research. There will undoubtedly be a vastly increased program of industrial research in the United States, and this program should include the whole range of investigations covering the properties and utilization of forest products. Industries, certainly for their profits and possibly in some cases almost for their existence, will be dependent upon the investigative efforts which they make for themselves or those which are made for them by other agencies and the results of which they apply. Investigations to determine the properties of materials and the best methods for their manufacture and use are going to have a very decided bearing on the extent to which these materials hold their place in after-the-war competition. No industry can count on holding for its products any field which it has formerly occupied. This holds true of wood and the forest and wood-using industries as much as any others. It is going to be a question of competition all along the line, beginning with the use of land, then between materials and industries in our own country, and finally, as a part of the struggle friendly or otherwise, with other nations.

AMERICAN LUMBER FOR NORWAY

THE first shipment of American house-building materials, ever sent to the wood-producing nation of Norway has just recently gone forward, according to an announcement from the Bureau of Foreign and Domestic Commerce. It is declared that the shipment is the beginning of a lumber trade which promises to develop to important dimensions.

A New York correspondent of the Bureau reports a recent trip to Louisiana where he purchased about 120,000 feet of yellow pine in the different dimensions suitable for wooden buildings, and says that the shipment was made direct to Norway from New Orleans. Another order half the size quickly followed.

The correspondent also tells of having placed orders for high-class carved interiors in quartered oak, mahogany and satinwood for homes to be erected in Christiania, as samples of American lumber building materials. Stocks of such materials are to be carried at Christiania, Bergen and Trondhjem by a company now in process of organization.

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"The January number of AMERICAN FORESTRY is before me and as a devout lover of the great-outdoors, and especially the trees, I want to add my bit of praise to this most interesting issue. The appearance of the paper, the interesting articles and above all the beautiful and luring pictures are indeed worthy of commendation."—*C. E. Davidson, Editor Dealer's Bulletin.*

"Permit me to offer my hearty congratulations on the February number of AMERICAN FORESTRY. The cover is attractive and the contents are so varied that every one who has a spark of love for outdoors can find something worth while that is of special interest to him. You are setting a fast pace for yourself if the magazine is to continue to improve as it has in the past. Go to it, and the best of luck."—*Joseph W. Tatum.*

"Just a line to let you know that in my estimation, you are making a wonderfully fine magazine. It is getting more attractive and valuable each month, and I am sure for you it must be a thing of beauty and a joy forever."—*D. E. Beasley.*

"I want to express my particular delight in the February AMERICAN FORESTRY which has just come to my desk. You surely have succeeded in making a readable magazine."—*J. Horace McFarland.*

"I have had in mind to write you for some days past, inquiring about Glacier National Park, and incidentally to compliment you on the AMERICAN FORESTRY. I think it fine."—*C. A. Lightner.*

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CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

On January 29, 30 and 31 were held in Montreal the most interesting and best attended Forestry, Lumbering and Pulp and Paper meetings ever held in Canada and it is doubtful if any such get-together meetings of foresters and lumber and paper men were ever held before on this continent. The papers and discussion were all of a most practical nature and showed a strong spirit and desire for co-operation.

The meeting of the Canadian Forestry Association showed that body to be in a most flourishing condition, with nearly one thousand new members and a record of much useful work for the past year. Addresses were made by Major Barrington Moore, of the United States Forest Service on the work of the American Forestry Units in France and by F. J. Campbell, President of the Canadian Pulp and Paper Association, and W. Gerrard Power, President of the Canadian Lumbermen's Association. The only new officers elected were Clyde Leavitt, Forester of the Commission of Conservation, as Vice-President, and P. B. Wilson, of the Spanish River Pulp and Paper Company, as a Director.

The attendance at the meeting of the Canadian Society of Forest Engineers was the largest since the founding of the Society. The guests were, Major Barrington Moore, F. J. Campbell, Prof. Macarthy, of Syracuse University; W. G. Howard, New York Commission of Conservation; H. R. Bristol, Forester of the Delaware & Hudson Railroad; D. A. Crocker and Mr. Shepard, of the Lincoln Paper Company, and Lieut. H. M. Kinghorn. After the dinner most of the evening was taken up with a discussion of the necessity for forestry research work in the woods, following a most excellent paper on the subject by Dr. C. D. Howe, of the University of Toronto, and a most interesting discussion on forestry education and training. Dr. Howe pointed out very forcibly the lack of accurate knowledge of silvicultural and ecological and biological conditions in the woods and urged that more intensive work along these lines be conducted by studies on the ground and the establishment of sample plots where continuous studies could be made.

The Forestry Conference, under the joint auspices of the Quebec Forest Protective Association and the Woodlands Section of the Canadian Pulp and Paper Association, was opened by the Hon. Minister of Lands and Forests of Quebec, Jules Allard, who said that his Government was anxious to do all in its power to forward the proper

protection and utilization of the forests and their proper conservation. Brig.-General J. B. White, D. S. O., who has been in command of the Forestry Corps in France, gave a very interesting talk on his work and on forestry conditions in France and said most forcefully that Canada must begin planting operations at once and advocated the use of returned soldiers for this work. Prof. J. M. Swaine, of the Dominion Bureau of Entomology, read an interesting paper on insect damage to the forests. Prof. Swain has spent several years in field work in the forests from the Atlantic to the Pacific and has done much work of a practical nature. His work shows that now the danger to the forests from insects is greater than that from fire and advocates more careful protective measures, chief of which is the burning of logging debris. He said that the balsam fir was so infested with fungous disease at present and so liable to attacks from borers that it was probably only a question of time before this species would be practically wiped out in Eastern Canada. Mr. Clyde Leavitt read a paper on burning logging debris from the standpoint of fire protection and logging and there were some very interesting discussions in which many practical woods operators took part. A committee of heads of Woodlands Departments was appointed to go thoroughly into the matter and to make actual experiments in burning logging debris under actual operating conditions and to report on the cost and feasibility. Dr. Fiske, of the Life Extension Institute of New York, read a paper on Health in Relation to Business. Lieut. Lewis gave a most interesting talk on the interpretation of aerial photographs, illustrated by actual photos taken at the front. He showed the wonderful possibilities of such photography for making timber reconnaissances, mapping unexplored and difficult country and following the process of logging operations. There is no doubt but that in a short time the airplane will be widely used for these and other purposes. The committees on hardwood utilization and improvement of logging conditions reported and the reports brought out most interesting and practical discussion. The latter committee was continued with instructions to go into the woods and report on as many actual logging operations as possible. Demonstrations of caterpillar tractors and a new, horse-drawn, motor-operated rotary snow-plow were given.

The papers and discussion at the meet-

ings and the discussion carried on informally by the men present seemed to bring out the following conclusions. That the present great need is for some protection against insects and fungi in the forests. That logging methods will have to be improved in order to cut down their cost and to leave the forests in better condition for a second crop. That the present method of cutting to a diameter limit is bad for the forest. That some means must be found to utilize the hardwood from mixed hardwood-softwood forests and that planting on a large scale must begin at once.

The meetings of the Technical Section of the Canadian Pulp and Paper Association and its general meeting were very interesting and largely attended and the latter brought out also the need for forest planting and the recommendation to employ returned soldiers in such work.

The Minister of Lands and Forests of Quebec has offered to contribute to the expense of a sea-plane patrol of timber limits to try out this method and see practically how it will work for fire-protection and for making maps. He has also asked the Quebec Limit Holder's Association to send a delegation to see him to discuss a law to be introduced at the 1920 session of the legislature to encourage forest planting. Such a law has been drawn up by a committee of the Association and was submitted to the Minister on the twelfth of February.

Mr. Piche, Chief Forester of Quebec, has written that he met Mr. Ridsdale, Executive Secretary of the American Forestry Association, in France and that they are both working to help reforestation in that country. He also says that everyone in Paris is talking English and that the "poilus" are making English "communiqués" to their English and American comrades-in-arms.

H. M. MacMillan, who has been assistant to Major Austin Taylor, in the splendid work of the Imperial Munitions Board in getting out airplane spruce in British Columbia, will soon finish with that work. MacMillan's record as Chief Forester of British Columbia, as Canadian Trade Commissioner to the Far East and in the Spruce Production Division has been one of which he may well be very proud.

R. D. Craig, another forester, also did good work in charge of the Spruce Inspection.

The Riordon Pulp and Paper Company have agreed to continue their contribution to the co-operative investigative work being carried out by the Commission of Conservation under the direction of Dr. Howe.

The St. Maurice Paper Company of Three Rivers, Quebec, have commenced mapping and estimating their timberlands. The work is being carried out by Mr. Galarneau, chief forester, assisted by Messrs. Nix and Terry.

The Hon. A. E. Smith, Minister of Lands of the Province of New Brunswick, gave a most interesting talk on his work in putting the administration of New Brunswick's forests on a sound and scientific basis and in taking it out of politics. He made the statement that after their survey and estimate was completed that if he found it necessary to curtail the cut in that Province for the sake of perpetuating the forests that he would certainly do it. New Brunswick and Quebec are running a neck and neck race in the work of putting their forestry administration on a sound and enduring basis.

It looks as if it was "up to" Ontario to make a move for the placing of its timber sales branch under the direction of the forestry branch and to begin a survey of its forest resources.

The Timberman, in its January issue, describes a method in use in Sweden by which branch wood and other wood up to four inches in diameter is cut up by a machine into pieces and burnt like coal. This proved very successful where too deep a layer was not placed on the grate and shows a way in which much wood now wasted could be utilized.



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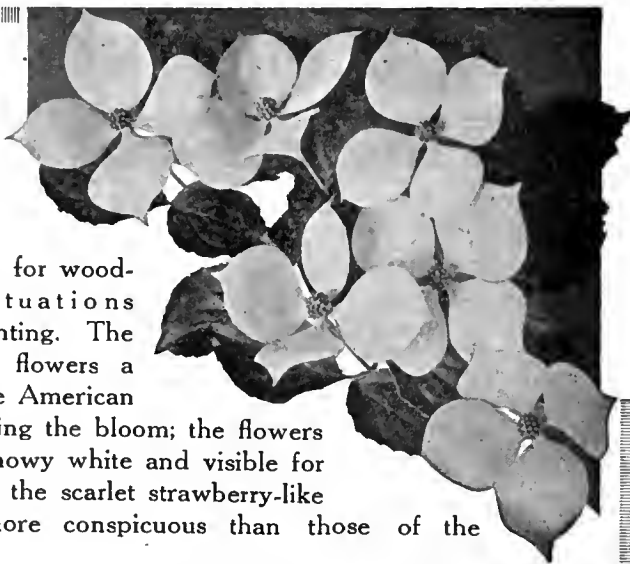
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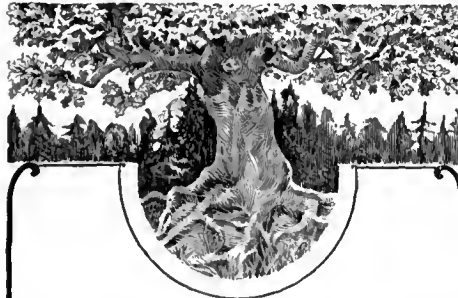
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Trade journals and consular reports

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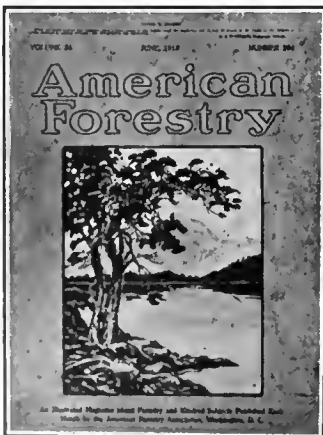
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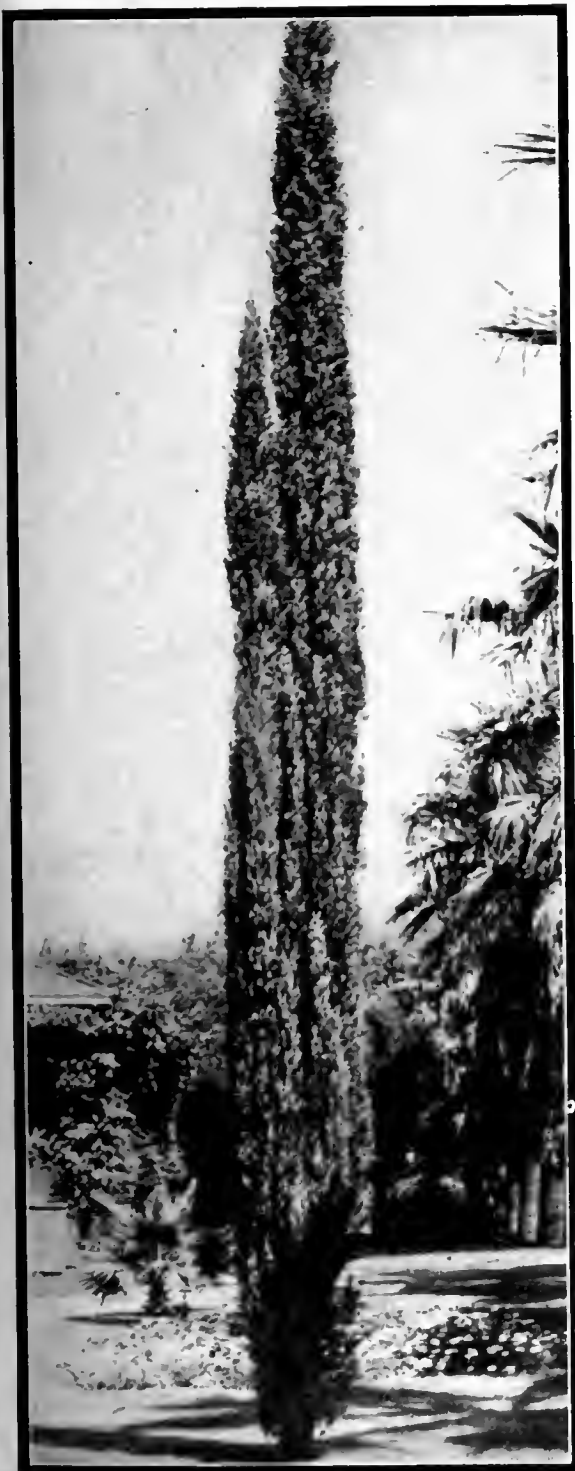
THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

APRIL 1919 VOL. 25

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ITALIAN CYPRESS

This beautiful tree is a native of Europe and Asia. It is a tall, very slender, tapering tree, with branches lying close to the stem. Often used to line a driveway or enhance a vista, it is most adaptable for landscape work. (Photograph by courtesy of the California Nursery Company.)

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TREES HERE DOING A DOUBLE SERVICE

These trees not only hid advancing French and American troops from enemy flying machine observers, but provided lumber for such dugouts as are seen. Comparatively heavy timber covered with earth provided fairly good protection from the enemy shells and forests and woodlands were always shelled because they were used to conceal troops.



CANADIANS GETTING OUT HEAVY TIMBER

Heavy timber such as shown in this photograph was used for piling, bridge building, canal repair work, etc., by the Allies, while the Germans cut quantities of it to roof dug-outs. These heavy timbers covered with several feet of earth made the dugouts safe from even the heaviest shells.

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NO. 304

FRENCH FORESTS FOR OUR ARMY

BY PERCIVAL SHELDON RIDSDALE

EDITOR OF AMERICAN FORESTRY MAGAZINE

This is the second of a series of articles on the effect of the Great War on the forests of Europe, articles based on information secured during a tour of Great Britain, France, and Belgium in December, 1918, and January and February, 1919, taken for the purpose of investigating war-time forest losses and of ascertaining how best America can aid in restoring the forests of our Allies.—EDITOR.

TOURS, FRANCE, January 30, 1919.

HERE is the headquarters of the 20th Regiment of Engineers composed of lumbermen and foresters, the largest regiment in the world, and the organization upon which the American Expeditionary Force depended for its lumber for war needs and for its fuel wood. Here, since the organization was completed by the merging of the two battalions of the 10th Regiment, mostly forestry troops, with the 20th Regiment, mostly lumbermen, Col. James A. Woodruff, a West Pointer and regular army officer, has been in command, with Lieut.-Col. W. B. Greeley, of the United States Forest Service and a director of the American Forestry Association, assisting him in directing the operations.

Tours, being the headquarters for the S. O. S., —the Service of Supply—for the A. E. F., and being the concentration station for the supplies which are landed at Bordeaux, St. Nazaire and Brest, became the natural place to locate the directing forces of the 20th Regiment which supplied the troops with so much of the material which they needed in railroad, camp and trench construction.

Here it was possible not only to secure information regarding the work of the regiment but also, by automobile to visit some of the lumber camps to see the conditions under which the boys worked. The information received, the impressions secured, the conditions experienced I pass on to the readers of AMERICAN FORESTRY

Magazine, not so much in the effort to give a detailed account of the accomplishments of the regiment, which will come in later articles, as to convey to them outstanding facts which should be of the most general interest.

First then the feature which attracts attention at once, the fact that it is the largest regiment in the world:

The regiment is composed of 49 companies of approximately 250 men each, divided into 14 battalions and having connected with it 36 Engineer Service Companies or labor troops. The regiment originally was organized to contain 48 companies, but the 49th was added in France, being composed of members of the New England Saw Mill Unit who had spent almost two years in cutting in the Scotch forests. Three officers and 90 men of this Saw Mill Unit volunteered as a

FRENCH FOREST LOSSES

\$800,000,000 is the general estimate of the war losses and loss in reproduction value of the destroyed forests of France. It is estimated that **16,960,000,000** board feet of saw timber have been felled in the French forests since the war started. Nine-tenths of this timber was used for military purposes. In addition, military operations have destroyed **2,544,000,000** board feet, while the Germans confiscated **2,968,000,000** board feet. The total estimated drain on the French forests is, therefore, some **22,472,000,000** board feet. It would take France fully one hundred years to fully recuperate from these forest losses, for the productive capacity of the French forests has been reduced about **424,000,000** board feet a year over a very long period. Devastated forests in France cannot be put to agricultural uses because the soil is of such a quality that under French economic conditions the forest crop is the most profitable one that will grow upon land assigned for forest production.

nucleus of the 49th Company of the 20th Regiment and the full complement of the company was secured by getting men from other organizations.

The chief forest cutting of the regiment was in the Vosges section with Epinal as the headquarters of the operating companies. The forests there were chiefly of Scotch pine, fir and spruce. At Eclaron was the largest single installation, a mill capable of shipping, as it did, an average of five thousand ties a day. This mill was situated in the forests of Argonne and furnished lumber, largely duck boards, bridge timbers, piles and poles, etc., for the 1st and 2nd Armies. Colonel C. S. Chapman,

with headquarters at Neufelatel had entire control of this advanced section and of all the operations in the departments of the Vosges, Doubs, Cote d'Or and Aube, so that his work consisted of supplying all the requisitions in the zone of active operations for the A. E. F.

The Eclaron mills were situated near some big ammunition dumps and as the plant was run all day and all night, being electrically lighted, it made a very good target for the German bombers. The mills were bombed several times but none of the workers were injured nor was much damage done, and finally a real American trick resulted in so misleading the German bombers that the danger was entirely overcome. This trick was devised by

Major Spencer who, realizing that the electrically lighted mill was a bright target for the German bombers, ran electric wires into the heavy woods for a distance of one-third of a mile from the mill and installed a number of electric lights on the trees. Whenever an alarm of an air raid came, the lights of the mill were extinguished and the lights among the trees one-third of a mile from the mill were lighted by switching on the current and were kept blazing while the

Germans wasted bombs on them and inflicted damage only on some of the trees.

Other mills up along the fighting front were also bombed frequently, but without serious damage.

The amount of wood required by an army for fuel, in winter especially, is not appreciated by the civilian. For instance, at the time the armistice was signed, Lieutenant-Colonel A. S. Peck, assisted by Major R. J. Stuart, Captain Donald Bruce, Captain Joseph Kittridge, Jr., some twenty lieutenants and twenty sergeants of the 20th had charge of 10,000 quartermaster troops, all colored,

cutting fire wood for the 1st and 2nd American Armies, at the fighting front, with headquarters at Chaumont. These men, cutting hard-wood coppice, and using transportation on forty and sixty centimeter railroads, by wagon truck or any other method of carriage available, and working always to get the wood cut as near the location of the troops as possible, managed to secure and maintain a daily production of about 3,000 cords of wood a day. This amount of wood supplied fuel for approximately 1,000,000 troops.

The first mills used by the regiment when its first units reached France were French mills, but their daily production was so low that the units changed to American

built mills as soon as possible, and within a few months all of the mills in operation were using machinery sent from the United States.

At the time the armistice was signed, the regiment had eighty-one lumber mills in operation and twelve more being installed. The average value of these plants was \$15,000 apiece. When I was in France the sale of these saw mills and their machinery, which were of course of no further use to the American Army, was somewhat retarded, if not



WEAVING SUPPORTS FOR SIDES OF TRENCHES

This photograph shows the manner in which brush and small trees were used to prevent the earth on the sides of the trenches caving in. Great quantities of these mats were used by the Germans as well as the allied armies.

wholly prevented by army red tape. As one officer intimated, Congress is evidently afraid to trust an army officer to sell any army material, or so one might be led to believe, as the Act regarding the sale of army material provides that the sale price shall include not only the original cost, but also the cost of installation. As a result, many of the lumber mills will probably have to be scrapped and sold as scrap, if the officers of the 20th Regiment do not manage to get special permission to sell them at the best prices they can obtain.

The men of the regiment with whom I came in contact

at the lumber camps were in good health and fine physical condition, despite the generally disagreeable weather conditions of the winter months, their hard work and the fact that much of their labor was performed in the rain and mud. The majority of them had put on weight, which is not surprising when one considers the fact that they are unusually well cared for, particularly as far as their physical condition and their diet is concerned. After their ten hours of hard work each day, they return to their lumber camps, strip off their wet and muddy clothing, have hot showers with plenty of water and an entire change of dry clothing

for the evening. Their diet is somewhat larger than that of the men in other units, on account of the very hard work which they do. I believe the increase in ration above other units is about seven per cent, and some of the officers stated that a ten or twelve per cent increase was most desirable. At any rate there seemed nothing lacking in the mid-day dinner which I had with Lieutenant-Colonel Greeley at the camp at Chenonceaux, where the 29th Company, in charge of Captain J. H. Price, was located. Here we had pot-roast, cut thick and piled high on the platter, rich gravy and plenty of it, potatoes, macaroni and tomatoes, canned cherries, con-



EFFECT OF SHELL AND RIFLE FIRE

This was once a standard under coppice forest near Ribercourt and on the route to Lassingy. It was practically totally destroyed by the heavy firing during a prolonged battle.



FOREST CASUALTIES LIKE THESE ARE SEEN ALL ALONG THE FIGHTING FRONT

Wherever there has been a severe military action in woodlands or forests the trees have suffered much as these have. The scene is near Verdun and heavy shell fire swept the woods.

densed milk, sugar, butter, and a large thick peach pie, cut only twice, making each portion one-quarter of a pie, and a real American pie at that. So husky and vigorous are men living under these conditions that despite their ten hours of hard work during the day, their favorite recreation at night is in some athletic exercise or game.

At first the men were rather well crowded together, a few large barracks being erected at a camp and usually sixty men being assigned to each barracks. Later, however, it was found that the men were better contented and kept in better health by being separated in squad tents, or small

barracks, with eight men to a squad. This arrangement greatly facilitated the isolation of ill men. The squad tents were boarded to a height of four feet and well

sodded and floored. Each had a small stove, was equipped with six or eight bunks and was easy to keep warm and dry and comfortable. In some camps where tents were not to be had, huts were built and served the same purpose.

Various units of the regiment performed particularly good work during the September drive of the Allied Armies which forced the Germans back so quickly. During one day's operation, the American fighting



CUTTING AND SHARPENING BARBED WIRE STAKES

These stakes or poles from five to six feet in length used for supporting barbed wire entanglements were cut by the hundred thousand for use not only on the fighting line, but for second and third line defenses.



SMALL POSTS USED FOR WIRE ENTANGLEMENTS

Many hundreds of thousands of these posts were cut by the contending armies and on them was stretched thousands of miles of barbed wire. The line of trenches is indicated by the whitish soil. Many miles of such trenches formed lines of defense between the German advance and Paris.



A HEAVILY SHELLED ROAD NEAR RIBERCOURT

Here the automobile in which the writer toured the battlefield was stuck in a shell hole for six hours. A terrific battle had been fought over this ground, thousands of tons of war material was scattered in the fields and woods and within sight was an old quarry which housed several thousand German troops.

troops captured three rail heads and the immediate problem was to provide enough ties to connect these rail heads with the French railroads nearest to them. Thousands of ties were needed but by hard work with every available man, the Forest units assigned to the task of providing the ties, secured the desired number in a remarkably short time.

The 7th Battalion, which was placed at the disposal of the French Government, manufactured entirely free of cost to the French Government, the following quantities of timber: 4,468,000 board feet of lumber; 199,808 standard gauge ties; 191,604 narrow gauge ties; 127,475 poles and props; 54,647 steres of fuelwood. This is enough to build 665 barracks; 195 miles of railroad; 1,595 miles of telephone line on the basis that half the round material was poles; and warm a detachment of 500 French Infantry 150 years.

The casualties of the regiment were, of course, not large, as most of the men worked in sections far behind the range of German guns. Among the casualties, however, are those of

two officers, Captain Harry H. MacPherson and Captain Wilford A. Fair, who were killed by German machine gunners on October 5, 1918. These men were looking for mill locations in the Argonne forests. In some manner the Germans got behind the troops in the advanced section during the night and the next morning as the two officers walked through the forests, hidden German machine gunners fired upon them. MacPherson fell, badly wounded and Fair gallantly ran forward to aid him and was killed as he knelt over his dying fellow-officer. Captain Fair was cited for gallantry.

First Lieutenant John H. Kelly was killed in a motor smash-up. Master Engineer George L. Nutter and Sergeant Alcott were killed at St. Julien by a railroad train while doing a rush loading job.

The influenza was serious at two or three camps and several men succumbed. At the Mimizan camp in the Lands Dis-



THE PRESIDENT AND THE BAKERS

When President Poincaré of France visited Chateau Thierry after the American troops drove out the Germans he complimented the bakers of the town upon their successful efforts to provide bread for the civilian population.



LUMBER USED IN TRENCH CONSTRUCTION

The sides of this trench of an advanced post of French troops along the Marne are braced by small branches woven together and nailed upright of two and three inches in diameter. The dugout is roofed with heavier timber. The trench shows the damage done by a German shell which exploded in it.

trict the 11th Company had a number of cases and fourteen deaths, among the dead being Corporal Charles J. Cumisky, who devoted himself to attending the sick men without thought of his own physical condition. Even after he had been stricken with the disease, he continued to work and finally fell exhausted and died shortly afterward. He was recommended for a Distinguished Service Medal.

Within an easy run from Tours by automobile, one may see scores of fine old chateaux, and among the most interesting of these is the Castle of Chambord. In the extensive grounds attached to the chateau, a considerable amount of forest cutting was done. The story of the arrangements for this cutting is interesting.

The castle was built during the sixteenth century as a hunting lodge for the Royal family and in order to keep the game in and to keep the poaching peasants out, a wall some ten or twelve feet high and about two

feet thick, and twenty-one miles in circumference was built and is still standing and in good condition. When the war broke out this property, which is owned by an Austrian nobleman, was taken in charge by the French Government, under somewhat the same conditions as the Alien Property Custodian of the United States took charge of the property of aliens here, and as it contained some fine stands of pine, portions of its forests were leased to the American Forest Units and were cut.

To appreciate the manner in which the French, British, Canadians and Americans co-operated in the purchase of forests and in their lumber production it must be remembered that as early as September, 1916, because of increasing difficulties of transport, the British Army decided it would be necessary to secure its timber supplies in



THE WELL KNOWN DUCK BOARD

Each army made great quantities of these duck boards for the bottom of trenches and for muddy and slippery ground back of the trenches. The British, after the armistice was signed, manufactured 1,000,000 of the ten foot lengths on which the duck boards were nailed. These cost seven francs each and the British expected to sell them for no more than one franc each.

France. Accordingly, General MacDougal, head of the Canadian Forestry Corps, secured mill equipment and forestry companies to handle the exploitations. The forests were supplied free of charge by the French in return for certain tonnage which France required for the transport of raw materials.

It was not until September, 1917, that the Comite Franco-Britannique de Bois de Guerre was organized by Lieutenant Sebastien, to handle the acquisition of stand-

name of the committee was changed to Comite Interallie des Bois de Guerre. The work of the larger organization was transacted by an executive committee composed of Lieutenant Sebastien for France; Colonel John Sutherland for Great Britain; Lieutenant-Colonel John Lyall for Canada, and Major T. S. Woolsey, Jr. (for standing timber) and Major Barrington Moore (for lumber, etc.) for the United States.

This committee which met twice a week, purchased all standing timber outside the army zone, for the British and American armies, and later was joined by a Belgian delegate, Major Parlongue. Timber purchase in the war zone, which consisted chiefly of fuel, was conducted by Lieutenant-Colonel Peck working through the French Mission at Chaumont at which city General Pershing established the American Expeditionary Force headquarters. Major Badrey, of the French Forestry Service,



THE FRENCH GAS MASK

Wood workers were often so close to the fighting that they had to wear gas masks for protection while gathering fuel wood or securing stakes for barbed wire.

ing timber and the purchase of manufactured lumber from Switzerland and other countries for the British Service. This Executive Committee worked under the supervision of General Chevalier, Chief of the Inspection Generale des Bois, under the Ministry of Armement, which controls all the wood centers of France.

When Lieutenant-Colonel Graves, Chief of the United States Forest Service, arrived in France to organize the American Forestry Section, one of his first decisions was to join this wood committee in order to avoid competition with other army services in France, and in order to reap the benefits of an efficient existing organization. Accordingly, in September, 1917, Colonel Graves was appointed American Delegate to this committee, and the



THE FRENCH CUT LOW

With true French thrift applied to forest cutting the French forests left stumps as low as cutting with axes or saws permitted.

was attached to this mission for the express purpose of facilitating these purchases.

Under an agreement between France and England, France supplied the standing timber, while England supplied the equipment and personnel, for manufacture and transport to the railways. When the Americans joined the C. I. B. G. the British were established in the Landes, Normandy, and in the Vosges-Jura. In addition there

were a few pole operations in central France, south of Orleans. Since this latter area was on the American line of communication, the British kindly withdrew their operations and ceded this area exclusively for American exploitation. One of the first problems was to define purchase areas for the use of the American or British services—the French retaining the right to purchase in all portions of France.

The Landes was divided so as to facilitate British water transport from Bordeaux and Bayonne to a port in northern France close to the British front. This arrangement was necessary because of shortage of rolling stock in France and the difficulties of transporting wood materials

tion, the A. E. F. undoubtedly would have paid far higher prices for their timber and would have had greater difficulty in securing it. According to Major Woolsey, of the 20th Regiment, the A. E. F. owes a debt of gratitude to Lieutenant-Colonel Sutherland and Lieutenant Sebastian of the C. I. B. G., for their co-operation. Lieutenant Sebastian, the head of the C. I. B. G. Executive, worked tirelessly in the interests of the Allied timber supply, not only having charge of the purchase of standing timber in the S. O. S. of France, but also negotiating important purchasing agreements with Switzerland, Spain, Portugal and Scandinavian countries. Repeatedly, when the situation demanded, Colonel Sutherland withdrew his claims



A PONTOON BRIDGE ACROSS THE MARNE

The rapidity with which these bridges are built when the lumber for the pontoons and for the bridge makes it necessary for the forestry units to be prepared to fill quickly all demands for pontoon lumber.

from Bordeaux north on the American lines of communication.

Similarly the Vosges and Jura timber areas were divided between the British and Americans so as to interfere to the least possible extent with their railway transport. The Vosges-Jura exploitations were particularly important for France since she secured a large per cent of her aviation material, manufactured by the Canadians, from the splendid spruce forests that make this region one of the most valuable in France. Normandy being near the British front was reserved for them.

Had it not been for the British and French co-opera-

tion, the A. E. F. undoubtedly would have paid far higher prices for their timber and would have had greater difficulty in securing it.

On account of war speculation, the price of timber in France had more than doubled since the beginning of the war. In the Jura, timber which before the war brought \$16.00 per thousand feet on the stump sold for from \$32.00 to \$45.00 per thousand feet, counting $3\frac{1}{2}$ cubic meters of standing timber as equal to one thousand board feet.

It was owing to the assistance of Lieutenant-Colonel Joubaire, chairman of the French committee having charge of the purchase or leasing of private forests, that

the A. E. F. was able to purchase private forests at even less than the current market rate. Colonel Joubaire unquestionably saved the United States more than a million dollars because of his skill in treating with private owners.

value, which arose to two or three times the pre-war value. The sale of private forests and the prices for them were fixed by a Committee from the Board of Armament, and it is interesting to note that the prices



FRENCH FORESTRY TROOPS

There is no waste in this kind of cutting nor is there any waste in disposing of tops and small branches. These are either used by the soldiers for fuel wood or civilians pay for the privilege of gathering them for fuel.

Take this as an illustration: One of the first forests operated by American troops—the Forest of Boisgenceau—was offered for \$800,000 by an Italian speculator, and when the C. I. B. G. saw that the price was exorbitant the forest was immediately requisitioned for war needs. The appraisal of Colonel Joubaire on the value of the forest was secured and the final purchase price was close to \$140,000 as opposed to \$800,000 originally asked. In innumerable cases, where the demands of private owners have been exorbitant, as they almost invariably were, Colonel Joubaire was able to reduce the price to an equitable figure. When it is considered that the A. E. F., when the final settlement is made, will have purchased some \$10,000,000 of standing timber in France, the importance of the co-operation secured through the C. I. B. G. can be fully appreciated.

About 40 per cent of French forests are State forests, about 20 per cent Communal and about 40 per cent private. The prices for the State and Communal forests were fixed by a Committee of the Department of Agriculture and the stumpage prices were based on the market

for these private forests were about fifteen per cent below the prices fixed by the Committee of the Department of Agriculture. Some private forest owners desired clean cutting, so that they might take every possible advantage of the prevailing high prices for their timber. Others with an eye to future production permitted cutting on a forestry basis only, while all the cutting of State and Communal forests was entirely on a forestry basis and was so regulated that on the average the productive value of such forests was restricted not more than five years.

As France, prior to the starting of the war, imported about 1,484,000,000 board feet of manufactured material more than she produced, the French shortage must now be met by continued over-exploitation of her forest resources, by commercial imports, or by imposing a refund of German timber from German forests.

Over-exploitation is, of course, impossible because if continued it would bring erosion, floods and unfavorable climatic conditions, and would destroy local wood industries upon which many thousands of French people

depend, in a considerable measure, for their livelihood.

Importation is undesirable because of the high cost.

What the French prefer and advocate, is a provision in the Peace Treaty for compelling Germany to refund to France the amount of timber destroyed in France. That Germany is capable of doing this is evident as she is rich in forest wealth. Her total wooded area amounts to almost 35,000,000 acres and her annual production, exclusive of fire wood, is about 8,500,000,000 board feet.

crage and vehicles. Large lumber such as yellow pine, Douglas fir, etc., is desired for bridge, railroad and canal repair and construction. Most of the construction lumber and general lumber which she may need can be supplied from her own resources and after a short time may be secured from the Baltic region at lower prices than she could secure the same lumber from America. Finland has a quantity of lumber ready to ship and lacks only the shipping. This timber is from forests cut on about



WORK FOR FOREST REGIMENT UNITS AND BRIDGE ENGINEERS

The Germans destroyed this bridge in their retreat from Chateau Thierry and pontoons made of lumber produced by the 20th Regiment units near the fighting line and constructed by bridge engineers were needed for the troops advancing in pursuit.

Lumbermen of the United States are naturally curious to learn of lumber trade possibilities in Europe, and it was therefore interesting to secure information regarding the possibility of American lumber finding a market in France. Some inquiries revealed the information that there is a possible market for hardwoods of the best grade for interior work, parquet flooring, furniture, coop-

a fifty-year rotation period. The American lumbermen must realize the necessity in developing a market abroad, of taking advantage of the Webb Law, establishing agencies, meeting earnest competition and making a market for the sale of their best material to the high-class trade by using clever salesmen earnestly advertising their goods and quickly meeting the market conditions.

CASCARA STUMPAGE ADVERTISED ON SIUSLAW

THE first advertisement of cascara-bark stumpage on the National Forests is now being run. The advertisement covers some eight hundred acres on the Smith River drainage basin in the Siuslaw National Forest, which is estimated to yield twenty thousand pounds of dry cascara-bark. The minimum price named is three cents per pound, which has been the prevailing price for

cascara-bark stumpage on the National Forest during the high prices of the last year. Many sales of cascara-bark, aggregating thousands of pounds, are made every year on the Siuslaw, but most of the sales are for small amounts. Peeling of cascara-bark is ordinarily distinctly a home industry, done by the settler with perhaps the help of some member of his family.

THE USES OF WOOD

WOODEN BOATS AND THEIR MANUFACTURE

BY HU MAXWELL

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

STATISTICS of the woods used in the building of ships and boats, as they are referred to in this article, belong to the period immediately preceding the beginning of the war. No similar figures have been published covering the time since the war began. Pine, fir, and oak supply most of the woods consumed in the ship industry: pine 80,000,000 feet a year; fir, 44,000,000, and oak, 32,000,000. These are round numbers and some of them should be given more in detail. The principal pines used by the makers of ships are the following:

Southern yellow pine, 65,698,652; white pine, 14,256,006; western yellow pine, 518,500; sugar pine, 200,500; total pine, 80,673,658.

Three or more southern yellow pines contribute to the total, notably, longleaf, shortleaf, and loblolly. Northern white pine and Idaho white pine are listed without distinction. Western yellow pine is a single species, and that is also true of sugar pine. Forty per cent of all the wood used by American boat builders is pine. Twenty per

cent of all is fir. A dozen species of fir are native of the United States, but nearly all that goes into boat building is Douglas fir.

Other softwoods play a rather small part in shipbuilding, though some of them are quite valuable for particular purposes. The following table gives the annual consumption of softwoods:

Pine, 80,673,658; fir, 44,342,080; spruce, 7,783,980; cedar, 6,999,722; cypress, 5,014,775; hemlock, 4,745,775; redwood, 837,500; larch, 328,525; total, 150,728,011.

No foreign softwoods have been reported in our shipbuilding though several imported hardwoods are listed, as is shown in the following table of foreign hardwoods:

Mahogany, 1,190,192; teak, 764,309; eucalyptus, 273,050; Spanish cedar, 27,300; Circassian walnut, 25,000; balsa, 20,000; lignum vitae, 10,000; padouk, 8,375; rungas, 500; cocobola, 200; total, 2,319,557.

Most of the foreign wood is worked into finish and specialties for large and small boats. Teak is



A CATBOAT UNDER SAIL

The man who understands the manipulation of a catboat possesses the key to a world of enjoyment which is unknown to the uninitiated; but the novice may be brought to realize the meaning of the proverb: "Hard to manage as a catboat in a squall." The picture is shown by courtesy of Daniel Crosby & Son, Oyster-ville, Massachusetts.

deck wood, mahogany, Circassian walnut, Spanish cedar, and padouk, go into finish, eucalyptus is made into tree-nails, balsa into life preservers, and lignum vitae is choice material for bearings or gudgeons.

Domestic hardwoods contribute more than 46,000,000 feet a year to the boat-building industry, the separate contributions being shown in the list below:

Oak, 32,382,311; ash, 7,985,554; birch, 1,055,167; maple, 1,014,167; basswood, 959,000; chestnut, 751,295; elm, 706,600; yellow poplar, 448,077; beech, 219,366; locust, 215,028; cherry, 184,976; red gum, 164,000;

sycamore, black walnut, and apple; the tough are elm, hickory, cottonwood, and willow.

It would be interesting to know what changes the war has brought in kinds and quantity of woods demanded by ship yards; but that information is not yet obtainable and probably will not be for two or three years after the close of the war.

It was customary in England after the Revolutionary war had separated this country from that, to speak of American vessels as "fir ships." That was the custom especially when war ships were under discussion. It



HIGHEST GRADE SHIP TIMBERS

Douglas fir met the emergency when the call came for ships in a hurry to send our army across the sea. This is a fir ship under construction, and the builders were never held up an hour on account of shortage of timber. It came faster than the carpenters could use it. The photograph was furnished for this cut by the West Coast Lumbermen's Association.

tupelo, 138,499; hickory, 110,195; butternut, 78,237; California laurel, 47,500; sycamore, 38,000; cottonwood, 14,026; black walnut, 3,750; apple, 1,500; willow, 1,000; wild china, 1,000; total, 46,519,239.

Some of these woods have special uses, but it may be said of them generally that they fill places where strength, hardness, or beauty is required. The strong and hard woods in the list are oak, ash, birch, beech, locust, and hickory; the beautiful in grain or color are oak, ash, birch, chestnut, cherry, gum, butternut, California laurel,

was not done in a spirit of praise, and yet it was not ridicule. They used the word fir as a general name for all American softwoods—pine in particular. American ships then were largely pine, either southern yellow pine from Georgia or the Carolinas, or white pine from New York or New England. Pine prevailed in shipbuilding then and it prevails yet; but changes have occurred in sources of supply during a century or more. Formerly nearly all the timber was cut near the Atlantic coast; but now thirty-one states build boats, as may be seen by the



A LARCH IN NORTHERN
MICHIGAN

The larch or tamarack furnishes roots of peculiar value in boat building. The large, sharply-hent taproot makes a knee to brace ship frames. The long, fibrous roots supplied the thread with which the Indians sewed together the pieces of bark in making their canoes. The larch sheds its leaves in winter, hence its nakedness in the picture.

following table which gives the annual demand by states for shipbuilding woods, the figures representing feet:

New York, 37,700,500; Pennsylvania, 26,716,000; California, 20,617,010; Oregon, 14,900,400; New Jersey, 13,341,796; Virginia, 11,138,497; Maine, 10,299,400; Delaware, 7,867,136; Connecticut, 7,084,354; Maryland, 6,350,700; Washington, 5,876,560; Massachusetts, 4,607,864; Louisiana, 4,589,300; Michigan, 4,480,200; Ohio, 3,322,660; Wisconsin, 2,669,000; Tennessee, 1,775,000; Florida, 1,615,000; West Virginia, 1,614,000; Indiana, 1,462,000; Arkansas, 1,210,000; Illinois, 1,020,000; North Carolina, 800,000; South Carolina, 756,000; District of Columbia, 535,000; Alabama, 511,000; Missouri, 431,000; Rhode Island, 414,000; Minnesota, 107,000; Idaho, 63,000.

The wood with which to build boats is doubtless procured in the forests of more than thirty-one states, but the reports do not show the origin of the timber which shipbuilders use, though it is well known that every forested region furnishes some of it.

The ship industry gives a better line on trade, from the historical view, than any other industry gives. Most commodities are intended to be sold in the markets of this and foreign countries; but ships are designed, not to be themselves sold, but to carry other products to market, and ships have never been built unless the builders were reasonably certain of cargoes. During early years American-built vessels carried cargoes to and from our shores, and while that condition existed, our shipbuilding was a pretty fair index to our sea borne trade. But gradually foreign vessels captured our ocean-borne traffic and our vessels almost dis-



A SPLENDID CANOE TREE

The yellow or tulip poplar was formerly known as the canoe poplar because it was the best in the eastern states for dugout canoes, hewed from its faultless trunk. Such trees are now sawed into house finish and stock for making vehicle bodies. It is the largest hardwood tree of the United States.

appeared from the seas. A discussion of the causes of that unfortunate state of affairs does not fall within the scope of this article. The early builders of ships and boats in America brought the art with them when they crossed the sea. Among them were men who were masters of the business. They belonged to the foremost seafaring people of that period; and when they landed on the eastern coast of the New World their practiced eyes quickly surveyed the unbroken forests and saw an abundance of ship material ready for cutting. They had scarcely set foot on the shore before some of them began to build ships, and their descendants have been building ships ever since. They received occasional hints from the native Americans, but no serious lessons, for the Indians were poor seafarers. Some of them ventured in their light boats a few miles from shore to fish, fight, or hunt, but their chief activities afloat were confined to rivers, lakes, and other inland waters. The Indians' boats were built for

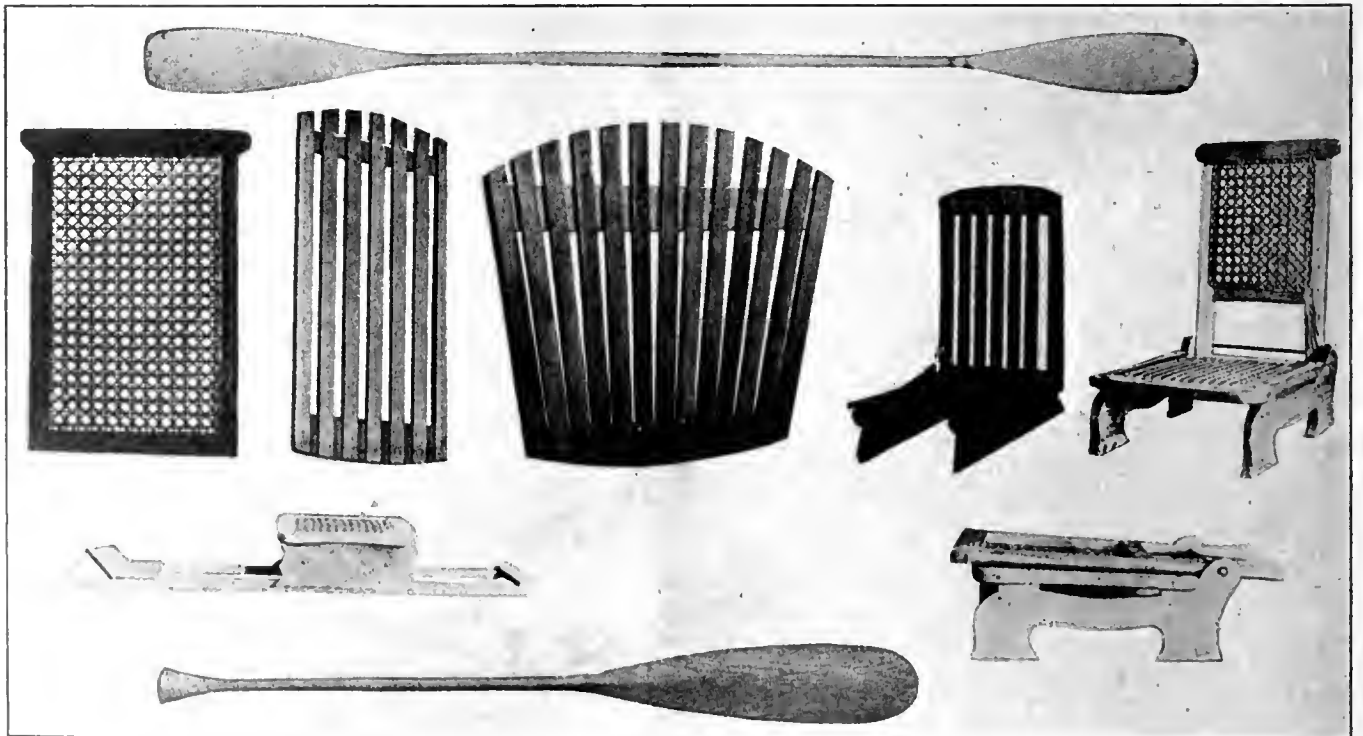
smooth waters, for the most part, and along that particular line they were able to teach the newcomers, and they did so. Nevertheless, not much that was new in making boats or in sailing them was found in America. Nearly all that the aborigines knew had been known hundreds or thousands of years before by people of the Old World. The Indian's canoe was the most interesting of his inventions or discoveries as a means of water travel, and he had two kinds of canoes, one of bark, and one of wood. It is not necessary to deal with these at length, but it is proper to speak of them, because canoes modeled after those of the Indians performed a very important part in our early history, and these canoes are with us yet, though in modified form. They are used now for pleasure more than for business.

The bark canoe was most in use on northern waters, and it was generally made of the bark of paper birch, though some were made of the bark of elm, basswood, hickory, and of other trees. The



THE IDEAL BARK CANOE

Canoes like that in the picture may be seen in dreams and heard of in romance, but such things in real life are not much in evidence. Let no one look for a canoe, which is little longer than a man, carrying two persons while floating high and graceful as a white swan. They are met with only on the pages of summer resort folders.



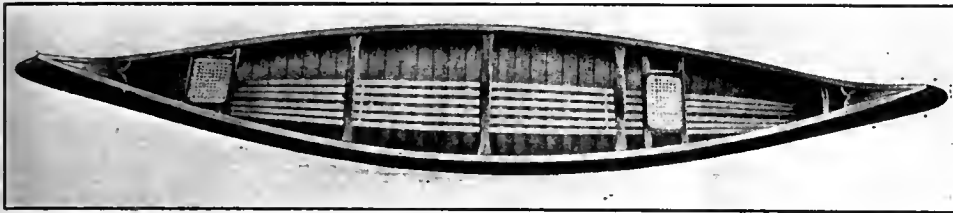
ADJUNCTS OF PLEASURE BOATS

These articles consist of a single and a double paddle, three styles of back rests and two folding canoe chairs, and adjustable rowing seats. Such articles belong in the industry which makes boats and supplies, and they are produced in very great quantities.

pieces of bark were sewed together with strips of hickory, basswood, or wicopy bark, or with the fibrous roots of tamarack; and the seams were made watertight with pine and balsam resin, or with the pulpy inner bark of slippery elm. Such canoes varied in size from the shallow coracle four feet long, thirty inches wide, and six inches

their spouts with wood, thus killing the monsters. It is apparent that the flimsy vessel has played its part in history and romance. The bark canoe long ago disappeared except as a plaything to induce tourists to part with their dimes at resorts. It is believed that no factory makes bark canoes, though a few are still made by individuals.

The dugout is a canoe hollowed from the trunk of a tree, and in the past this boat varied in size from little troughs barely large enough to carry one man, up to enormous hollowed trees which might carry fifty men and their equipment. The Jesuit



deep, up to the trading vessel thirty feet long, thirty inches deep, and four and a half feet wide. When offered for sale, the largest bark canoes were held at about forty dollars. They were very important in trade, travel, and war. Alexander Mackenzie took one of them from the region of the Great Lakes to the Bering Sea by way of the Mackenzie and the Yukon Rivers. That was perhaps the longest single journey ever made in a boat propelled by human power alone. Bark canoes sometimes carried sails, and Louis Hennepin is authority for the claim that they could cover a distance of 160 to 180 miles



BIRCH BARK CANOE MODEL

The northern Indians reached such perfection in their birch bark canoes that the white man was never able to make any improvements in the model. The above cut gives two views, one sidewise, the other perpendicular, looking down into the canoe. No bark canoes are now on the market, though an occasional one is made for private use.

missionaries mentioned canoes a hundred or more feet long. The largest dugouts on record were made by Pacific Coast Indians of red cedar. Nearly any tree can be made into a dugout if the trunk is large enough, solid, and straight. White pine served well, yellow poplar was



IN A LIGHTER VEIN

Canoes built for pleasure hold their proper place in the ship and boat industry. Such canoes are met with by hundreds on lakes and rivers in the north country in summer. They are marvels of lightness, grace and beauty, and are constructed of the finest woods obtainable.

in a day under sails made of bark. New England Indians with fleets of bark canoes engaged in battle on the ocean, according to Roger Williams; and a fleet of fifty bark canoes and one hundred and seventy dugouts was mobilized on the Allegheny River in 1753 by the French for the invasion of the Ohio Valley. Lawson in his account of the Carolinas states that the Indians of that region hunted whales by sailing after them in canoes, mounting on their backs, and plugging

the favorite in the middle states, and cypress in the South. The Indians hollowed their canoes chiefly with fires, using stones and shell as scrapers to finish the work. Other good canoe woods were

sycamore, black walnut, butternut, cucumber, sassafras, ash, cherry, and red and white cedar. The lighter cedar canoe was the ordinary means by which the early farmers of New Jersey and eastern Pennsylvania carried their produce to market, according to Peter Kalm who wrote



LIVE OAK FOR SHIP KNEES

This is a fair and fine specimen of the southern live oak of which the largest ship knees have been made. This particular tree stands within the corporate limits of New Orleans and it is known locally as the "dueling oak," leaving the imagination to conjure up whatever uncanny associations it will, to account for the ominous name.

about 1749. The dugout was the primitive ferryboat almost everywhere in the eastern region before bridges were built, and made travel on foot possible and assisted the development of the country. As with the bark canoe, the dugout is seeing its last days and has disappeared except in a few remote districts where a relic may occasionally be seen. A log

of suitable size and form for an average dugout would saw from 500 to 1000 feet of lumber. Dugout canoes were common in Europe in very early times, as they doubtless were in all countries that had suitable timber.

The Indian canoe was valuable in its days. Formerly the settler or hunter went into the woods with ax, knife, and adz, and made his canoe. Today canoes, and all the light, small boats developed



THE BARK OF WHICH CANOES WERE MADE

Most Indian canoes in the North were of thin sheets of the bark of paper birch, stretched over frames of wood to hold it in shape. The above picture shows a sheet of this bark. The long lines in the bark are characteristic of this birch, though not peculiar to it. Similar markings may often be seen in cherry bark.

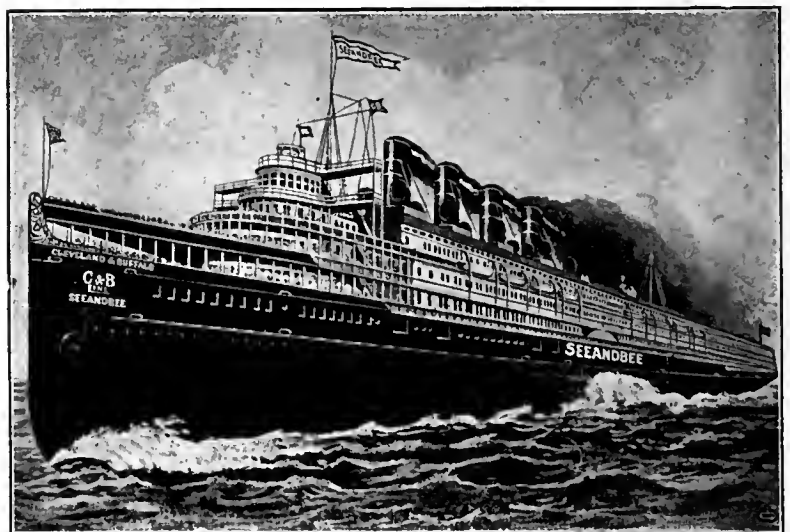
along the same lines, are factory made. The manufacturer selects his wood as carefully as ever the red hunter selected it, and he works it more skilfully and turns out a handsomer product. The light canoe which is now sold in sporting stores is modeled after the bark canoe more

than after the dugout, though both shapes are retained in modern production. The Indian and the white trapper made a frame of light sticks and slats, and over it they stretched the bark forming the skin of the vessel. The modern manufacturer makes a frame of slats also, but he makes the shell of his canoe of thin lumber in place of bark, or he may stretch waterproof canvas over a frame and make a collapsible boat. The modern canoe is a little more substantial than the Indian's handiwork, but what the modern canoe gains over its prototype in substantiability it loses in romance. "The forest life," "with its mystery and magic," of which Longfellow spoke in *Hiawatha*, is not in the factory canoe as it was in that made of cedar

slats, birch bark, and tamarack roots, by the wild hunters of the wilderness.

The bateau as formerly used in America was a flat-bottomed boat whose chief business consisted in carrying merchandise on the rivers and small lakes. The name was applied rather loosely to boats of several kinds and sizes; but one of the earliest patterns was made by sawing a dugout canoe down the middle from end to end, separating the halves four or five feet, still leaving them parallel, and nailing boards across to form a bottom. Bateaus made in that way carried large loads and sometimes ventured out to sea for long cruises up and down the coast. Fifty or sixty barrels of flour could be carried at a single load.

The bateau is not much spoken of by that name now, but it has been modified, developed, and enlarged until it



CALIFORNIA REDWOOD IN SHIPBUILDING

This splendid steamship is the Seeandbee of the Cleveland and Buffalo Transit Company. It is said to be the largest side-wheel ship in the world. The staterooms, partitions, canvas-covered decks and some other parts are of redwood. The cut is here shown by courtesy of the California Redwood Association.

has become the canal boat and the river barge of the present time. It always was and still is a slow and sluggish traveler and a carrier of heavy burdens. By building on it a superstructure, it becomes a houseboat, and many a one has assumed the dignity of a moving human residence. Such boats played a leading part in the "westward movement." Emigrants and homeseekers who "went



ONCE WAS IMPORTANT IN BOAT BUILDING

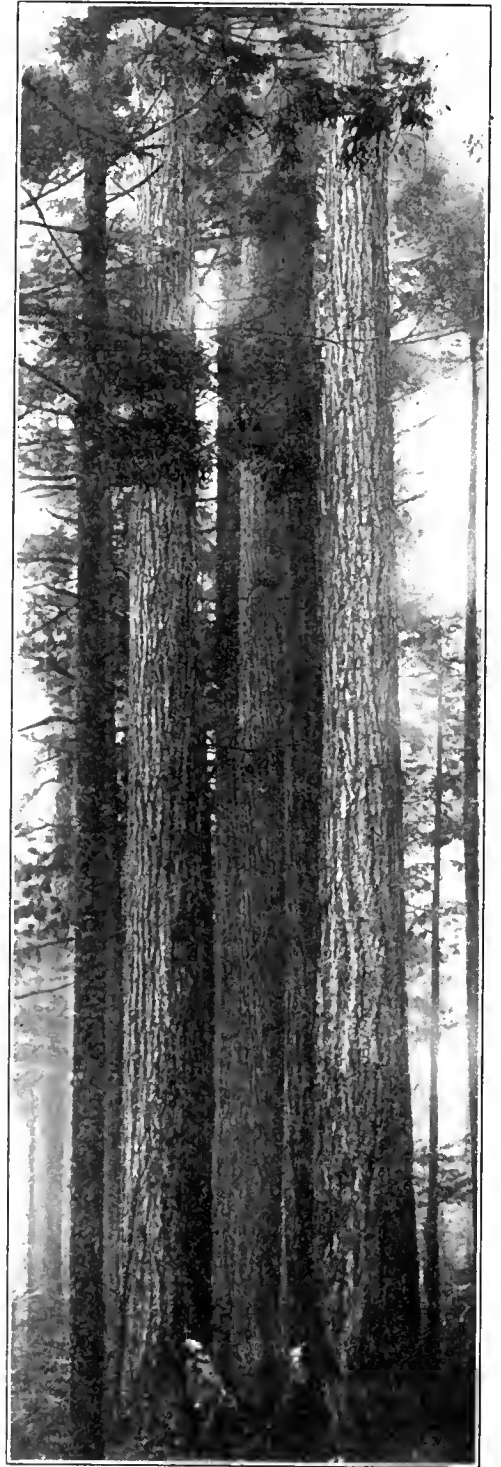
This is a balsam fir. It is not now of any special importance in the boat business, but it was the source of the balsam with which the Indian canoe maker stopped the leaks in his frail vessels and made them serviceable. When Hiawatha made his canoe he "took the tears of balsam" and made it waterproof, as Longfellow tells the story.

west" four or five generations ago built or bought such boats on the banks of the Ohio, Mississippi, Tennessee, Monongahela, and other rivers, and floated with the currents; or poled or paddled; or pulled or pushed their boats against the currents, and in that way worked slowly and courageously toward the land of promise. Their boats were of wood, usually to the last peg and treenail; and with broad-axes, poleaxes, crosscut saws, whipsaws, augers, and adzes, the boats were built of oak, yellow poplar, black walnut, cypress, and pine, before sawmills and shipyards made their appearance beyond the frontiers.

The trade boats intended for upstream travel were usually known as keelboats, and they were very important

on western rivers in the period intervening between the canoe and the steamboat. Keelboats were propelled by men with poles, and were made of any convenient wood, but yellow poplar and black walnut predominated on the Ohio River.

Pittsburgh was a noted point for traffic boats in early times, as it still is. Eastern adventurers gathered there



SUPERFINE SHIP MATERIAL.

Approximately a half a trillion feet of Douglas fir yet remain in the forests, according to the best estimates. No scarcity of ship material in the near future need be feared. Groups of trees like these in the above picture explain how it is possible for a single tree specie to produce such extraordinary amounts of timber. Photograph by the Kent Lumber Company, Seattle, Washington.

to "start west," and not only dozens, scores, and hundreds, but thousands of flat-bottomed boats were built in that vicinity to carry settlers to Kentucky, Ohio, Indiana, Illinois and Missouri. Today enormous barges assemble at Pittsburgh, as the pioneer boats assembled there a century or a century and a half ago, and move off down the river toward the west; but today they carry coal instead of emigrants. The same forests which furnished the planks for the bateaus of 1783, and the keelboats of a later time, still furnish planks for the coal-bearing river barges of 1918.

The wooden ships of commerce that sailed the seas during the early period of our history, and down to the present, have been made from relatively few woods, considering that our forests contain nearly six hundred species. The wood must be suitable and convenient. On the Atlantic coast white and yellow pine and white oak have been in most demand, but some elm has found place, as also a little hemlock, chestnut, beech, Norway pine, and yellow poplar. On the Pacific coast Douglas fir and Port Orford cedar were used in early ship-

building and are still so used. The construction of ocean-going merchant vessels on rivers far from the sea was an early industry. The upper Ohio, from the vicinity of Pittsburgh to Marietta, Ohio, was busy with shipbuilding before the opening of the nineteenth century. Ships built there, 2000 miles by the river highway from the

sea, were important carriers of American commerce. One of the ships when it reached Italy, was detained by the officials because the port of clearance was believed to be fictitious. They had never heard of Marietta. Ships built on the upper Ohio passed down the river at frequent intervals on their way to the sea, and carried cargoes to the West Indies, France, Italy, and to other foreign countries besides carrying coal, flour, glass, pork, and furniture to Philadelphia and other home ports. The first cargo of

coal from Pittsburgh to Philadelphia, 1794, by way of the Gulf of Mexico, sold at \$10.50 a ton at Philadelphia. It is worth mentioning that the Pittsburgh and Marietta ships were made largely of black walnut, and the wood attracted attention among shipbuilders because of its durability and on account of its great strength in proportion to its weight. The furniture carried in sailing ships from Pittsburgh was largely black walnut, cherry, and yellow birch, and it found a good market in the Atlantic coast cities.

The United States entered upon its navy program at a time when it

had become necessary to provide ships with which to fight the Mediterranean pirates, late in the eighteenth century and early in the nineteenth. Several vessels were constructed of southern pine and live oak. The first six ships contributed greatly to the early history and the romance of the United States. These ships were

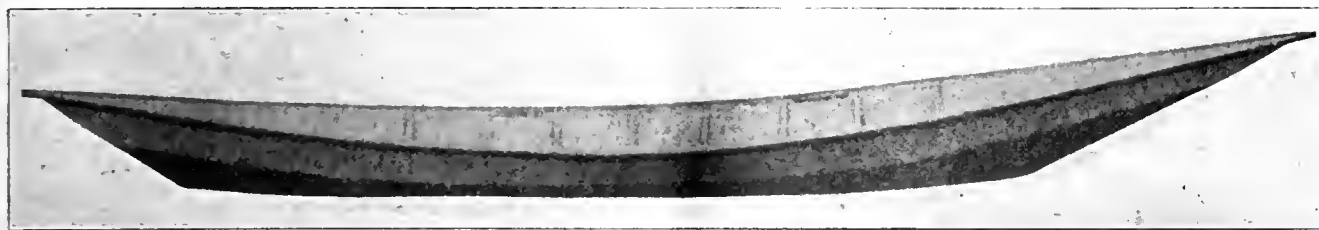


WESTERN CANOE CEDAR

This is the western red, or giant, cedar, and the picture is shown by courtesy of the Three Lakes Lumber Company. It was of this cedar that the Pacific Coast Indians made their remarkable canoes, some of which would carry nearly or quite a hundred men. The wood is soft and is easy to hew. Few dugouts are now made of it.

the *Congress*, *Constitution*, *President*, *United States*, *Constellation*, and *Chesapeake*. They were built of yellow pine, live oak, and locust. The *Constitution* was the famous "Old Ironsides" and it was never defeated though it fought many battles. It is still afloat, though much patched. The *United States* fell into the hands of the Confederates early in the Civil War, and when it was

When these six ships were planned it was believed that war vessels could not properly be built in America without live oak timber. The strong knees, cut from roots, limbs, and trunks, were the best in the world, and the planking and frames were nearly indestructible. In order to make sure of a supply of this splendid timber for all time, the government entered upon a policy of buying

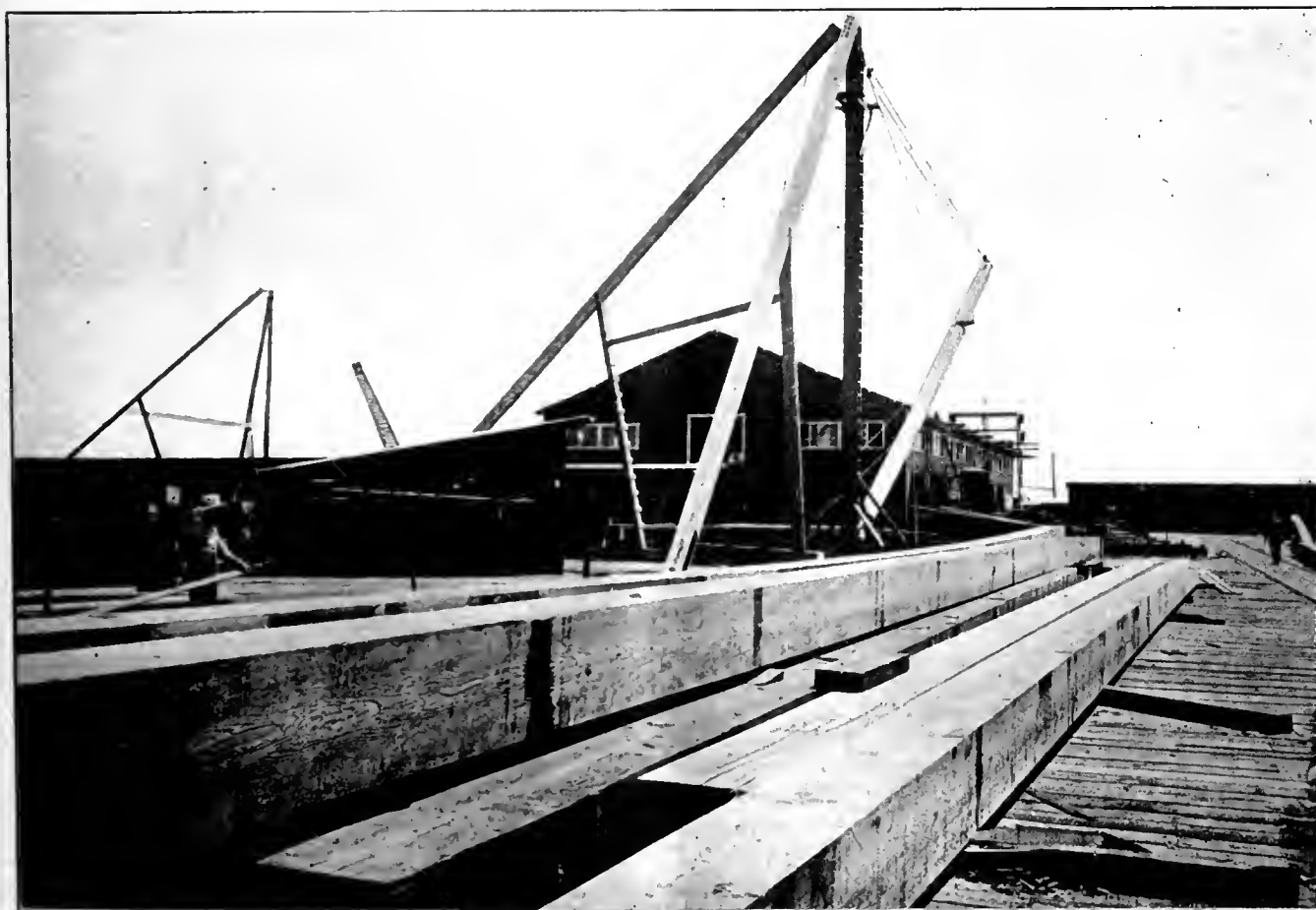


THE BATEAU STILL CARRIES TRADE

Bateaus, those serviceable boats of burden of the olden days, did not all disappear when the steamboat was invented. The accompanying cut represents a bateau advertised by its builder as being "for river and lake use," having "exceptional carrying capacity" and in great demand "among lumbermen, river drivers and contractors."

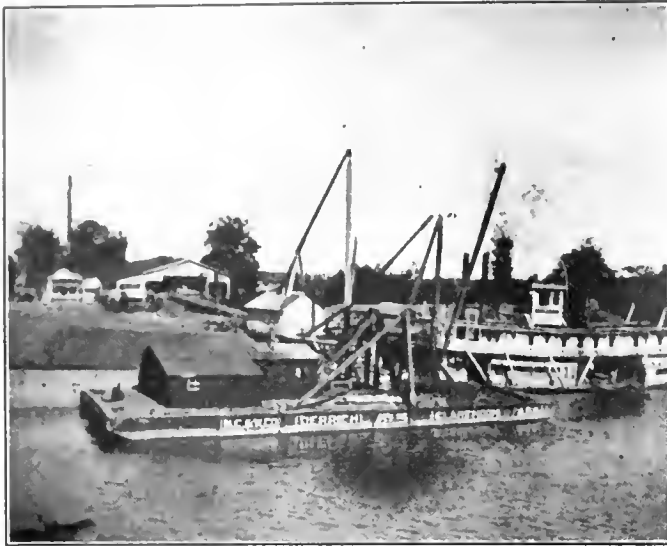
about to be recaptured, they sunk it in the Elizabeth River. It was raised, and it rounded out its 112 years of service. The *Chesapeake* was captured by the British in the War of 1812, but the commander's last command before his death in the fight has become a famous rallying cry, "Don't give up the ship." The shot-marked timbers were used in building a mill in England which was still in existence a few years ago.

live oak land and secured several tracts in Florida and Louisiana. That was really the beginning of the National Forest Service. It is worthy of note that the policy of buying land at that time was opposed, and prominent men urged the purchase of oak without the land. Their ideas of what would be needed were betrayed by the declaration of Benjamin Stoddart, a naval officer of that time (1799) that "\$100,000 will buy enough timber to



WITHOUT A RIVAL IN THE WORLD

Long, large and clear Douglas fir timbers like these were recently shipped by the trainload across the continent to eastern shipyards where a shortage of such stock threatened to tie up building operations and delay the completion of transports to carry American troops to Europe. Supplies were ample and the transports were completed in time, as is now a well-known fact.



SCOWS AND BARGES

Boats may be useful without being pleasing in appearance. Scows, dredges, barges and others that are designed to work in unromantic situations, are as necessary as are any others. They are generally built of heavy and durable planks and timbers to provide the strength which they must have to assure long service.

supply the navy for ages." Small prophetic vision had he of the mighty demands that would be made upon our forests to provide ships for our war with Germany in 1917 and 1918. All the timber needed for our first navy would scarcely supply one of our shipyards one month at this time.

The policy of buying and protecting forest lands fell into disuse when iron ships seemed to be about to do away with wooden vessels. The promise was not fulfilled, as the present war has emphasized. The oak land acquired as a ship timber reserve nearly all passed out of the government's ownership in the years following the advent of the iron ship; but a little of it remains in Florida and is included in the National Forest there.

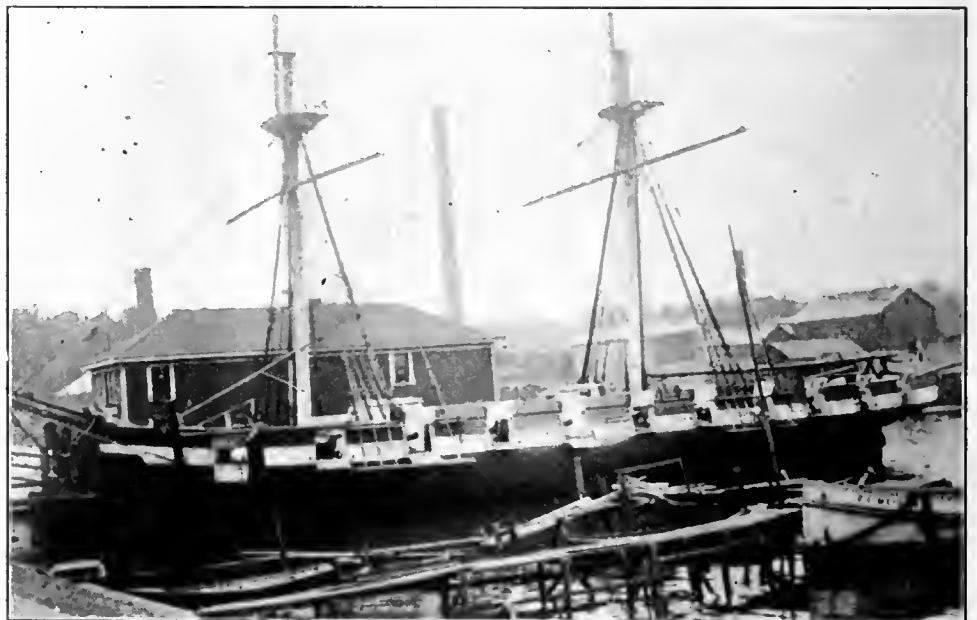
The "knee" is an essential in building the wooden ship. It is shaped like a crude capital L, and the bend suggest the name knee. It is a brace inserted in the angle where two timbers join in the framing near the bottom of the vessel. The braces are hewed or sawed from trees, a section of the trunk and the attached limb or root constituting the knee. Sizes vary. Large ships require huge and strong knees; other vessels take those of smaller size, while very small knees are sometimes used in boats which are little larger than big skiffs.

Many kinds of trees produce growths suitable for knees, but all do not. The wood must be strong and durable. The largest and strongest knees are those

hewed from southern live oak. Douglas fir is a valuable knee wood, and for small and medium-sized vessels much use is made of tamarack roots. This is the same tree that furnished roots as threads with which Indians sewed patches on their bark canoes. When the tamarack tree grows in the soil which it seems to like best, that is, a filled swamp with a soft soil a couple of feet deep above and a stratum of hard clay below, its roots take on a peculiar form. The root strikes straight down through the soft soil to the clay, and not being able to penetrate that, the root turns at right angles and follows the surface of the clay, thus forming the crook which becomes the knee.

All wood used by shipbuilders does not consist of heavy timbers. Doors, window frames, and inside finish of many kinds must be provided, much as is done in land buildings; and the kinds of wood used are not much different from those on shore. The iron ship needs wood finish in amounts depending upon the kind and size of the ship.

Our forests provide few woods suitable for the large pins with which ship timbers are fastened together. The pins are known as treenails and they vary in length from one to four feet and in diameter from a little less to a little more than an inch. Very hard and strong wood is demanded and it must possess small tendency to shrink and swell. Oak does fairly well if carefully selected and prepared, and a little red eucalyptus from California has been used on the Pacific coast, but the best is black locust. This tree's native range lies along the middle Appalachian Mountains and in the adjoining region east and west, though locust has been planted and it grows in nearly all parts of the United States. The manufacture of locust treenails by farmers and lumbermen was a paying business, on a small scale, until iron ships largely displaced wood. When we began building wooden ships to fight



COMMODORE PERRY'S FLAGSHIP NIAGARA

This relic of the war of 1812 was sunk in the Battle of Lake Erie in which the Americans won a signal victory over the British. The vessel was recently raised and is now one of the show objects at Erie, Pennsylvania. It was built of green timber cut on the lake shore and is in a good state of preservation.

Germany in 1917, the locust treenail came into larger use than ever in the past.

In building the war vessels constituting the first American navy, much locust was used for stanchions, braces and posts, the wood being so extraordinarily strong that small pieces were sufficient. In the War of 1812 American ships won victories in rapid succession over British

vessels of equal or larger sizes, and an English naval writer gave it as his opinion that the superiority of the American gunnery was due to the locust wood in the ships. Small stanchions and braces took up less of the precious space and gave the gunners more elbow room in serving their guns, and it may have had something to do with the marksmanship that won victories.

FOREST OPPORTUNITY ON PINE LANDS IN THE SOUTH

BY F. W. BESLEY

STATE FORESTER OF MARYLAND

THE South is the land of opportunity. A favorable climate, abundant rainfall, suitable soils, and a long growing season make it admirably adapted for growing crops. About fifty per cent of the land area is in forest, which points to the growing of timber as one of the most important crops of the South. Yet, with all these natural advantages, there is a vast area of idle land, and this area is increasing rather than diminishing. In these days, when increased crop production is demanded, it is of the greatest importance to devote all lands to their most productive use.

The three important uses of the land of the South are for agriculture, for forestry and for grazing, and the sooner a classification of land is made on this basis, the better it will be for all concerned. The area in farm crops is certain to increase and much cut-over land, now classed as forest but in an unproductive state, will come under the plow. There is, however, only a small percentage of this forest land that will be needed for many years to come, and the great bulk of it will probably remain in forest indefinitely.

The present uncertainty of future use injects an element of chance and speculation into the problem that seriously interferes with a permanent solution. In the mean time, awaiting a permanent classification of the land, it would be possible to grow another crop of timber on most of it to the great advantage of the country, and certainly without detriment to the land.

It is unfortunately true that no great amount of interest in growing timber can be secured in a section where there remains any considerable amount of the original forest. The statement was made by the Secretary of the Southern Pine Association at a meeting of Foresters in Jacksonville in January, 1919, that the large Southern pine operators at the present rate of cutting expected to be "cut out" in ten years. This may be reasonably assumed as practically ending the supply of virgin growth pine timber. After that the timber supply of the South will be dependent to a very large measure at least upon the second growth.

While the rapid disappearance of the original pine forests of the South, which have been the chief source of wealth, is somewhat appalling, it is not altogether an unmitigated evil. The business of exploitation by those who see no future value in the lands will eventually be succeeded on a large part of the pine area by the

business of timber growing on a basis of sustained yield.

There is no other part of the country that is better adapted for timber growing than the South. The most favorable conditions exist. Cheap lands, the best native species, rapid growth, combined with excellent transportation facilities and the possibility of developing important local wood-using industries, render conditions almost ideal.

The day of cheap timber is rapidly disappearing, just as rapidly as the disappearance of the original growth. The price of timber will be measured by the cost of growing it plus a reasonable profit. We are now passing through the transition stage from unrestricted timber exploitation, with a disregard for the future, to timber growing on a permanent basis, with a certainty of adequate returns on the investment.

There will be much changing in the ownership of land, and it will take many years to effect the readjustment, but it is certain to come, and with it a feeling of security of investment and enterprise that has never existed before.

The forests of the South have been the chief source of timber supply for more than two-thirds of the population of the United States for many years. The exhaustion of the original forests is not only going to remove a chief source of wealth to the South, but is going to have a far-reaching effect in the country at large.

A large part of the pine lands were acquired, and are still held, by lumber companies, whose chief concern has been, and still is, to cut and sell the timber and afterwards sell the land. After the timber is cut off, the land has little, if any, sale value, and consequently most of it is still held by the lumber company owners.

Under private ownership, the cut-over lands have been practically non-productive, partly because the owners could see no profit in a second crop, and partly because of the impossibility of protecting these lands against fires, so that reproduction could be secured. Little can be hoped for through private ownership under present conditions, and it is not likely that much can be expected from private initiative for many years to come.

It is manifestly the duty of the State to lead the way and to place timber growing in the South upon a permanent basis. Every State in the South should have a Forestry Department, organized for administrative and scientific work. Several of the States have already taken

this step. Each State should acquire and place under the management of its Forestry Department large areas of forest land, upon which to demonstrate the principles of applied forestry. Cut-over pine lands can be acquired at low cost, and, under the favorable conditions existing in the South, it should be possible to clearly and convincingly demonstrate the practicability of handling them for profitable timber production. This program will give to the State a definite problem to solve and a definite forest policy to follow. It would give the Forestry Department a stability and a permanency that does not now exist, and would enable the State to demonstrate the best methods of handling forest lands for timber production. Forest fires, which are today preventing forest

growth, must be brought under control. It has been demonstrated that fire in specific cases is an aid to reproduction, but it must be absolutely under control and used at the right time by those who know how to use it to aid the forest, and not left to the cattle raisers to scatter promiscuously for the destruction of the forest. The solution of the fire problem is, in a large measure, the key to the whole situation, and is one that must be worked out through much trial and tribulation. It is on large areas of State-owned land, where fire protection can be practiced without interference on a large scale, that the fire problem can best be worked out in a convincing way. Until that is done and public sentiment reconstructed timber growing as a business will not make progress.

WASHINGTON'S FIRST MEMORIAL TREE

THE first memorial tree planted in the Nation's Capital was in honor of the men from the United States Department of Agriculture, who gave their lives for their country. It was a white oak set out on the spacious department grounds, with Secretary Houston and Mr. Henry S. Graves, Chief Forester, both of whom

"gave up their lives in the great war. We will not forget the part they played in that struggle, nor their sacrifice. We shall pay tribute to their memory in divers ways.

"Today we are planting a tree for them. Nature will build from it a living monument. Every year it will



Photograph by Harris and Ewing

PLANTING WASHINGTON'S FIRST MEMORIAL TREE

are vice-presidents of the American Forestry Association, as chief participants in the simple ceremony. The various bureau chiefs and other officials of the department were present at the planting.

"Many members of our department," said Mr. Graves,

strike its roots deeper, raise its crown higher and spread its branches wider. It will grow in stature and strength, like our own appreciation of the devotion of the boys who gave all that their country and the world might be a better and happier place to live in."

FORWARD WITH TREE PLANTING

BY CHARLES LATHROP PACK

PRESIDENT, AMERICAN FORESTRY ASSOCIATION

*"He who plants a tree,
He plants love.
Tents of coolness spreading out above
Wayfarers he may not live to see.*

*Gifts that grow are best;
Hands that bless are blest.
Plant! Life does the rest."
(From poem "Plant a Tree,"
by Lucy Larcom.)*

IF YOU or your city have not joined the army of those who are planting trees, enlist now! With the growing interest in this movement, do not allow yourself or your community to lag behind. It is one of the most important pieces of reconstruction work in the United States in which you should have a part; in fact, it is a work which should be continuous and grow with the passing.

There is no reason why this should not be so. The interest which has been aroused in tree planting throughout the country should be maintained. The added impetus which has been given to this worthy enterprise by the suggestion of the American Forestry Association that trees be planted in honor of America's soldiers and sailors, both as memorials to the dead and as tokens of appreciation to the living for their offer of service, should not be allowed to die. It should be but the beginning of a great forward-sweeping desire and determination on the part of the people of America to see their cities and parks beautified with handsome trees, their roads and avenues shaded and strengthened and their forest resources enriched through a deepening and broadening of conservation methods and efforts. A patriotic chord was struck by the memorial tree-planting idea. It made an appeal which has been nation-wide; and in hundreds of places throughout the United States it has been carried into effect or plans are being made for its adoption either as a separate proposition or in connection with some other memorial being erected.

One of the big plans which has been suggested and which would fit in closely with that of the American Forestry Association, is that advanced by Col. Webb C.

Hayes, the son of a former president of the United States. Colonel Hayes was chairman of the Cuba-China Battlefield Commission of the War Department which was charged with the marking of graves of American soldiers who died in foreign service, and who has recently returned from France where he served as regional Commissioner for military labor.

This would provide for a county unit system of placing memorial tablets to the men who gave their lives for their country. These tablets would be placed on the county courthouse or on memorial highways extending from county to county, preferably at the points where these roads enter adjoining counties. Then the plan for setting memorial trees along these roads would be pushed. This would lead to the building or improvement of thousands of miles of roads in the United States and to the planting of many miles of fine trees, which would be an inspiration to other effort in this direction at the same time that it was serving as a daily reminder to the people of America of the blessings of democracy for which their sons and brothers had fought and died. Colonel Hayes believes also that the idea could be extended to France with a memorial highway marked by trees extending from Paris to a number of the battlefields where America's sons won undying honor.

Before leaving Europe Colonel Hayes cabled to the Chamber of Commerce at Fremont, Ohio, his home town offering to provide the tablets for the men from Sandusky County; and William G. Sharp, former American Ambassador to France, did the same thing for Lorain County. During the past session of Congress a bill was introduced by Representative Sherwood, of Ohio,



A MOST ORNAMENTAL TREE

The cone-shaped cypress with its graceful, light-green foliage is considered one of the finest trees that can be planted for decorative purposes, and is widely used throughout the United States.

although unfortunately it was killed in the rush of other business, which provided for the appointment of a commission to carry out the ideas of Colonel Hayes.

Large cities and small towns all over the United States are showing their approval of the memorial tree idea by putting it into practice. The story of what some of them are doing is an inspiration to others. Almost since the day of the signing of the armistice the question of memorials has been a subject of public discussion in nearly every city and town throughout the country. It was recognized at once that every place would desire to honor in some permanent manner the service rendered by those who had died or had offered their lives for their country. In this discussion there was one insistent note, heard time and time again. This was that the memorials should be worthy. There was frequent expression of the opinion that there should be no repetition of some of the "atrocities" which had been erected in "honor" of heroes of former wars.

The spirit which was back of these, it was acknowledged, had been patriotic and worthy of highest praise; but the outward expressions in many instances, it was declared, had been anything but ornamental and had therefore been the subject of frequent criticism. Of tree plant-

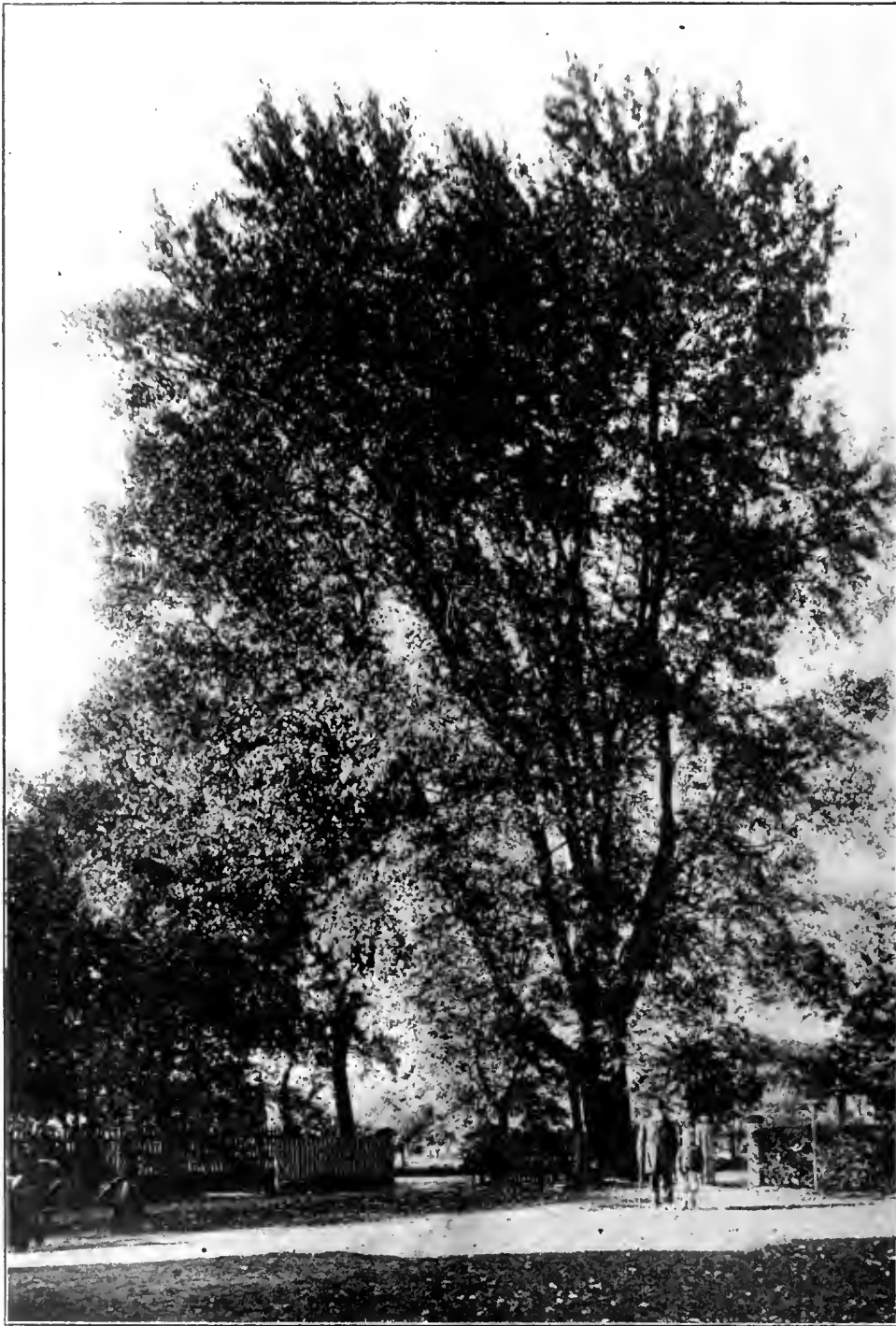
ing editors and others throughout the country have had nothing but words of praise. It is most gratifying that this should be so.

In a letter which Vice-President Marshall has written to the people of Collamer, Indiana, in his own home county, the story of whose tree planting appeared in last

month's issue of AMERICAN FORESTRY, there is well epitomized the sentiment which has been stated in other words by hundreds of other people. The Vice-President said in part:

"The idea appeals to me far more than storied urn or animated bust. It embodies a living thing, representative of a vital sentiment of the American people and I hope it is going to be universally popular in America."

One of the most active of the larger cities of the United States in the memorial tree campaign is Philadelphia, already noted for its spacious Fairmount Park with many acres of beautiful trees and for a comparatively large number of trees which it now enjoys along many of its



A FINE OLD SUGAR MAPLE

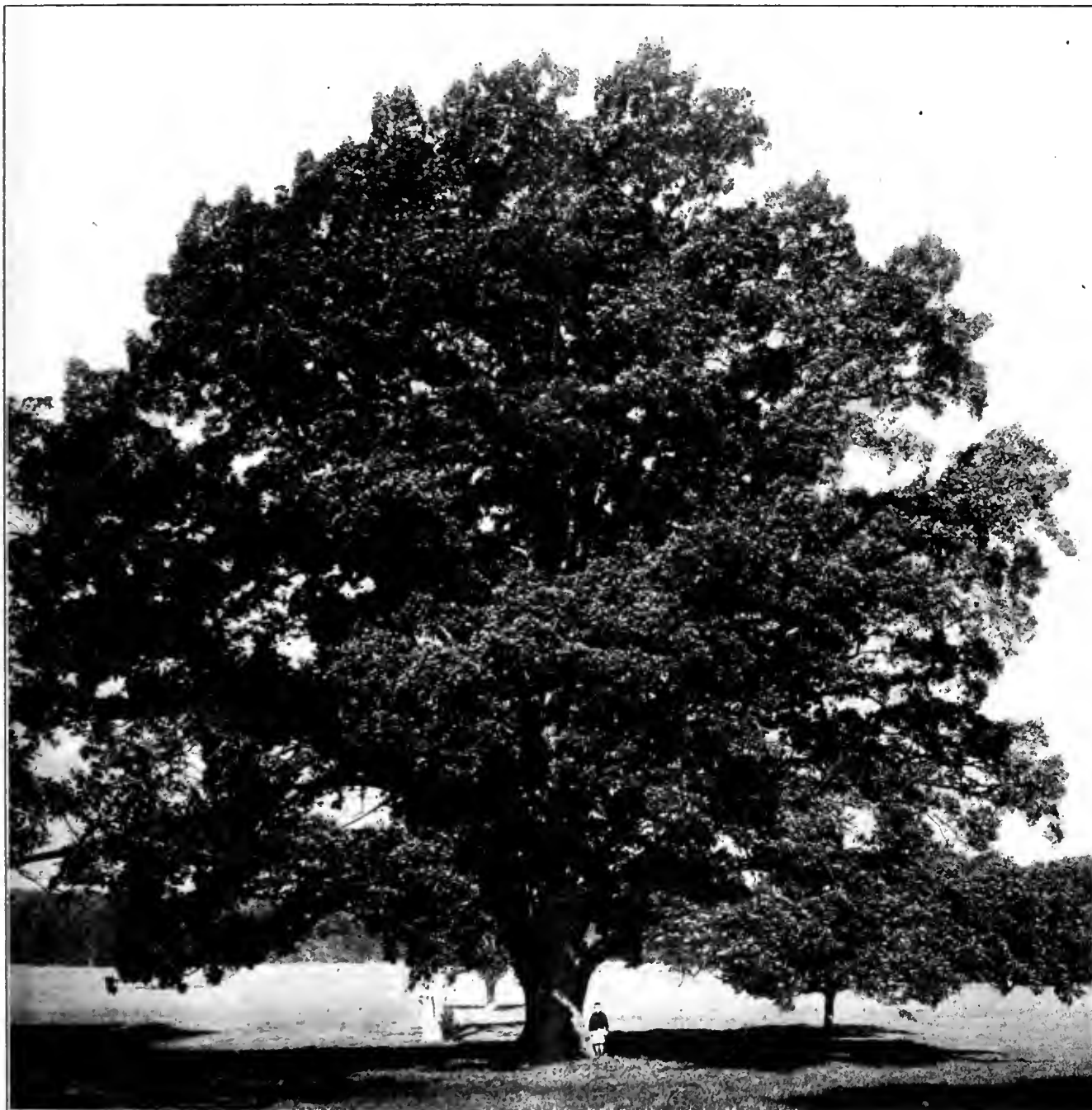
This is one of the most popular trees for planting. For city streets the Norway maple is to be preferred to the sugar variety, except on wide streets with parking. The noble specimen here shown stands in Howard County, Maryland.

streets and in its suburbs. There the committee on municipal art and tree planting of the Civic Club and the Society of Little Gardens, are leading in the movement to plant what they call "Tribute Trees." They will work in co-operation with the Fairmount Park Com-

mission which has charge of all tree planting in Philadelphia. Individuals who do not care to plant a tree of their own are invited to join with some community group in placing such memorial. The United States Marines were among the first to ask permission to participate in this patriotic undertaking; and they desire to plant a whole avenue of trees. The members of the Civic Club

Charles W. Henry, Mrs. Edward Stotesbury Lewis, Mrs. J. Howard Rhoads, Mrs. John Frederick Lewis, Mrs. W. Beaumont Whitney and Mrs. F. A. Rakestraw.

In a recent communication, published in a local paper, John R. Johnson, superintendent of parks, Passaic, New Jersey, said: "We are too apt to look upon trees in a more or less matter-of-fact way, as something Providence



A FITTING MEMORIAL TO STRONG DEEDS, FOR IT IS THE "SYMBOL OF STRENGTH"

Mention of the word oak brings to mind the thought of long life and endurance. As a family the oaks are undoubtedly among the best of shade trees, for they are beautiful, long lived and little subject to disease or insects. This monarch white oak is in central Maryland.

committee which is interested in the movement are Mrs. Howard W. Lewis, chairman; Mrs. Henry Wolf Bikle, secretary; Mrs. Edward W. Biddle, Mrs. Leon T. Ashcraft, Miss Mary Blakiston, Miss Sophia Cadwalader, Mrs. Charles Davis Clark, Mrs. L. Webster Fox, Mrs. Rodman E. Griscom, Mrs. Roger W. Griswold, Mrs.

has fully provided for and of which there can be no end. It seldom occurs to our mind that the pleasure we received, and the comfort enjoyed from their presence, is in great measure attributed to the forethought and activities of generations long since passed away."

They are now erecting monuments in Ohio to "Apple-

Seed Johnny" whose name is now a household word throughout the state because of the fact that this erratic knight errant of the road traveled hither and yon sowing the seed of tens of thousands of apple trees whose fruit he was never to enjoy but which have proved a great boon and a valued possession to others. That is the true spirit of the planter. He thinks of the future and of the enjoyment and blessing which will come to those yet unborn from the seed which he sows or the tree which he plants.

Similarly the future will rise to call those blessed who today are adorning our parks and avenues and the coun-



AMERICA'S MOST POPULAR TREE

It can be truly said that no other tree holds as high a place as the American or white elm. It is the most aristocratic of all the nation's shade trees; and is almost if not quite as beautiful a feature of the winter as of the summer landscape.

try's highways with handsome ornamental trees. Many of these will have a utilitarian value in and of themselves; but their greatest value from the economic point of view is likely to be the interest which they arouse in practical forestry, in conservation and in encouraging a more thorough and nation-wide study in the subject of timber resources. This is a matter which will become of greater and greater importance with the advance of our civilization and the increase of population not only in the United States but in other countries. The children will be taught the value of tree life because they will participate in the ceremonies incident to the plantings. They will know and come to appreciate more and more as they grow older the purpose for which this work was done. They will know it was because their fathers and their elder brothers were looking to the future welfare of mankind; and the lesson will impress its deep meaning on them.

The American Forestry Association is anxious to have its members interested not only in tree planting in this country but in the help which is to be extended to Great Britain, France and Belgium in restoring their badly cut or devastated forest areas. Percival Sheldon Ridsdale, Executive Secretary of the Association, who went abroad

early in the year to investigate the amount of damage done and to ascertain what assistance might be given, reports on his return that about one and one-half million acres of forest land in France has either been destroyed by shell, machine gun and rifle fire or by the cutting by the contending armies for barrack, trench and fuel wood; that practically all of Belgium's forests having any timber value had been cut down by the Germans and used or shipped back to Germany; that fully 450,000 acres of Great Britain's forests had been felled.

The forest authorities of each of the countries named have declared eager to have the assistance of the American Forestry Association in providing them with American forest tree seeds. This help is to be extended and the work will be carried on this year and in 1920.

There are many ways in which the people of the United States can have the subject of tree planting kept before them. Those who have the subject at heart should help in various ways to keep this topic to the fore. At the present time there seems to be no better way, no method that will call forth a more popular response, than by making it a memorial to the soldiers. But then there



A DESIRABLE SHADE TREE

Under favorable conditions the white ash grows fairly rapidly and attains a good size with a moderately broad open crown and thin foliage. It is native to a wide territory throughout the United States.

are other persons and events that can be memorialized, and most fittingly, in this manner. The American Forestry Association has suggested that trees be planted in honor of the late Colonel Roosevelt along highway to be named for him and elsewhere; and this is being done in a number of instances. There are other lovers of nature, men who through their written or spoken words or in other ways have taught the beauty of woods and trees and flowers; and to all such trees might appropriately be planted. One such was Walt Whitman, the

centenary of whose birth will be celebrated on May 31 next. Many others will be found, some of national, others merely of local renown, who are worthy of tribute of this sort from their fellow-citizens.

In order to secure the best results it is necessary that there be as widespread interest as possible in the work. What a majority of the people in a community want done, or even a much smaller band of enthusiastic workers, usually is done. Is there a local forestry improvement association in your neighborhood? If so help to make its work successful by action. If there is no shade

a city street is somewhat at a disadvantage and so some care should be used in selecting the best variety for the particular locality and then they should be planted carefully and well cared for. Trees are beautiful or otherwise as they harmonize with their surroundings. Those that will look well on a narrow street may not be suited for a wider street or a broad avenue. If there is any doubt on the question it is advisable to consult the state forest commission, the local forester or some other authority who can tell what varieties are best for a given locality. Of course, no general rules could be given for the entire



THE LARGEST BEECH IN MONTGOMERY COUNTY

That is the boast which this tree can make. It is 10½ feet in circumference with a spread of 90 feet. It casts too heavy a shade for street planting, but makes a beautiful lawn tree. The one shown here is in Chevy Chase, Maryland, not far from the District of Columbia line.

tree commission, no city forester or other organization interested in this vitally important subject, interest yourself in the formation of such an association. In any community, whether it be large or small, there should be co-ordination of effort to secure the best results in shade tree planting and care.

In selecting trees for street planting the following qualities should be considered in about the order named: form, hardiness or adaptability, rapidity of growth, shade protection, neatness and beauty. At best a tree on

United States, or even for a major portion thereof; but in a larger part of the eastern United States it will be found that for narrow streets the red maple, red gum or ginkgo can be recommended for narrow streets; for wider streets, Norway maple, basswood, horse chestnut or pin oak; and for wide avenues, white elm, white oak, red oak and tulip poplar.

Street trees should have hardiness and adaptability. They should be vigorous, be able to recover from mechanical injuries and be as non-resistant as possible

against insect attack and disease. While quick growing trees are desirable in some ways it must be remembered that such varieties are likely to be the shortest lived and will have to be replaced sooner than those of a somewhat slower growth, which with good care can be made to develop more rapidly.

It is not desirable to have trees which cast too much shade, particularly on narrow streets. Houses and sidewalks need sun even in summer. Again the question of neatness ought to be considered; and trees which will break up the pavement, such as silver maples, or those which cover the pavement with their bloom in the spring, such being cottonwoods and poplars, ought to be avoided. Evergreens are not suitable for street planting because their shade is not wanted in winter. Black locust should not be planted because it is likely to be destroyed by the

than if brick or other loose-jointed material is used.

In planting a tree move as many of the roots as possible. A cloudy day is better for transplanting a tree than a bright sunny one because a bright sun quickly exhausts the stored up moisture. An important point is in regard to packing the earth around the roots. They should have close contact with the ground, because a tree feeds through its roots, and therefore every smallest rootlet should be firmly in the ground. To do this, fill in around the roots with finely pulverized earth, working it under and around the roots by hand and compacting it. If the earth is wetted down as it is put in it will make a much better contact. It must be remembered that trees cannot take care of themselves. They need food and they need attention and so provision should be made for their nourishment and to see that they are properly pro-

THE VICE-PRESIDENT'S CHAMBER
WASHINGTON

February
Nineteen
1919

My dear Mr. Galbreath:

I am unable to say who was the author of the fine idea of planting trees in honor of the boys who answered their country's call for service in the war which we have waged against German autocracy. Whoever it was, in due season he will deserve a memorial at the hands of his countrymen.

The idea appeals to me far more than storied urn or animated bust. It embodies a living thing, representative of a vital sentiment of the American people and I hope it is going to be universally popular in America. When the trees shall grow large enough, a fitting

plata can be attached to each one of them, bearing the names of the soldiers.

Of course, it rejoices me greatly to know that the citizens of my county have, under your leadership, been among the first to take advantage of this idealistic and patriotic movement.

May Heaven send sunshine and showers upon these trees so that they may live to distant ages, - vital reminders to the youth of every generation of what America has done and great incentives to the doing of the fine things for which the Republic has been so remarkably conspicuous.

With sincere congratulations, I am,

Very truly yours,

John R. Marshall

Martin L. Galbreath,
Collamer, Ind.

borer worm. Beech is a slow grower and casts too dense a shade for any street.

There are several points to be taken into consideration. Trees planted along a street should be of the same kind, the same size and uniformly spaced. On narrow streets trees planted every forty feet apart, and alternated on opposite sides of the street, will be found sufficiently close; and on wider streets they should be from forty to sixty feet or even farther apart, the distance being determined partly by the size which the tree is likely to attain and other habits. Every tree should have at least six square feet of earth above its roots. It is more important that there be plenty of space where the pavement and roadway are paved with concrete

tected against insects and other pests and against damage from other causes.

Tree planting should form a permanent part of the improvement program in every city and town in the United States. It should not be undertaken in a temporary, haphazard manner; but should receive the constant thought and attention of those who are interested in making the community more attractive and at the same time in adding to the future timber resources of the United States. It must be remembered that what is done in one city or town serves as an inspiration to others; and that the habit once formed of setting out a number of trees every year will become fixed and will extend until it covers the nation.

WHY WOOD IS BEST

BY ALFRED GASKILL, STATE FORESTER OF NEW JERSEY

NO one thinks of building a battleship of stone, or a bridge of copper, or a cabin of steel. The qualities that determine the fitness of most structural materials are generally known; the inherent qualities of various woods, which make them valuable for specific purposes, rarely are recognized. Wood substance, or cellulose, is much the same in all kinds of wood, but a great diversity in the form and arrange-

(2) with reduction of the moisture content. The first requires a selection of the material more or less vigorous according to intended use; the second involves "seasoning," by storage or by artificial means, until the wood is "air dry." Fortunately it is now possible to know the real qualities of most of our commercial woods and to choose what is fit with only a guiding reference to old customs and preferences.



SPRUCE FENDER STOCK. OAK KEEL.—AT THE PHILADELPHIA NAVY YARD

ment of the elements produces a wide range of values. Practically every species has a characteristic structure, though it varies with the individual.

But though wood in general must be recognized as a material of great variability the constants in each species give positive advantages for many purposes. The truth of this depends upon the fact that fitness for service increases (1) with uniformity of structure and absence of defects (knots, cracks, crooked grain, etc.):

For engineers there have been constructed elaborate tables showing the resistances of all our principal woods to bending loads, compression, tension, shearing, indentation, etc.; the non-technical reader will be better satisfied with general statements.

The user of wood is apt to define its qualities by means of terms which mean quite definite things to him, but which really are relative, or are capable of various interpretations. For any important purpose it is advisable

to find the wood that furnishes the greatest total of desirable qualities *when air dry* as excess of moisture constitutes a defect. Quantity and availability often are decisive factors.

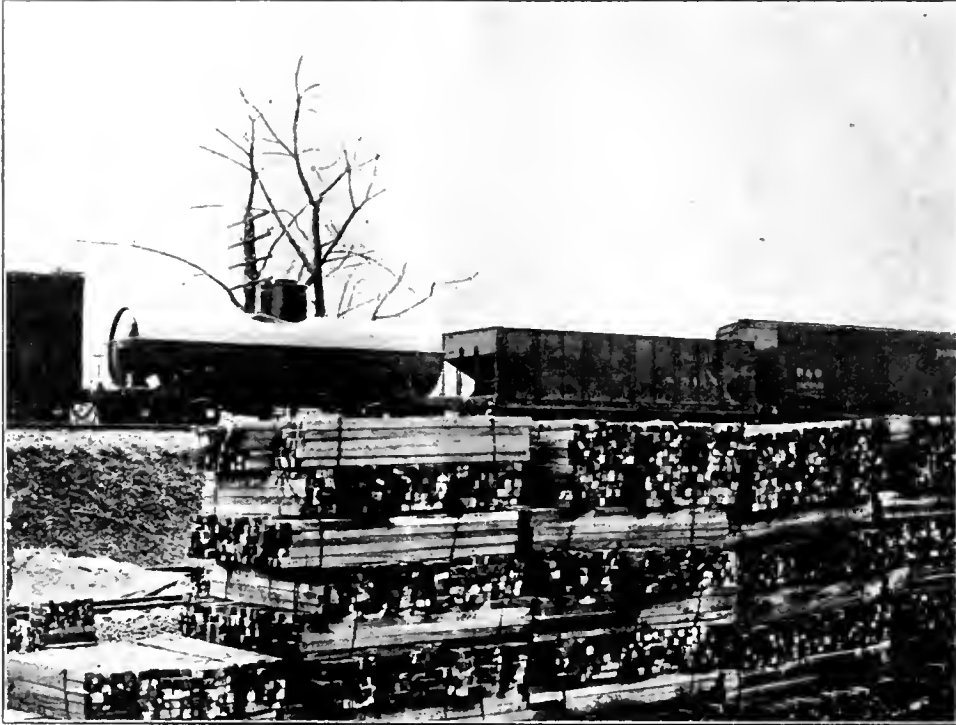
Strength is a term that is often loosely used to indicate the power of resistance to a strain without reference to other qualities, as weight, toughness, stiffness, etc. Thus hickory and white oak are strong to sustain a load, but in a beam may be less serviceable than longleaf pine or Douglas fir because the latter are stiffer. Pine on the other

hand makes a poor hoe handle because it is comparatively brittle; oak is better but is apt to become bowed and is too heavy; ash is best because it combines sufficient strength with stiffness, flexibility and moderate weight. Another sort of strength is that which resists shock and "shear"—the qualities required in a hammer handle, an ax helve and a wheel spoke. For such use no wood known answers so well as young, quickly-grown hickory.

Durability as descriptive of wood quality is even more loosely used than "strength."

Most of those who deal with woods in a technical way understand it to be the quality which resists decay. When kept perfectly dry, or when entirely immersed,

any kind of wood lasts indefinitely, but if exposed to warm air and moisture it behaves quite differently. Poplar, beech, maple and most pines decay so quickly in contact with the ground that they are unfit for use as fenceposts, telegraph poles, railroad ties, etc.—they are not durable. Other kinds, as black locust, red cedar, black walnut, chestnut, will last for



READY FOR SHIPMENT

Black locust squares $1\frac{1}{2} \times 1\frac{1}{2}$ in. by 12 in., 20 in., 24 in., 32 in., 36 in., 40 in., 46 in., long to be shipped for treenails. Keyser, West Virginia.

many years under similar conditions.

For many purposes the greatest value is found when durability is combined with other qualities. Black locust or white oak makes a good railroad tie, for instance, because it is hard to resist the cut of the rail as well as durable to withstand decay; a bridge sill must be strong to carry a load, hard to endure wear, and durable to resist decay.

Within recent years durability has lost much of its practical importance through the development of processes by which non-



SUGAR PINE SHAKES

This picture was taken in the Sequoia National Forest, California.

durable, or perishable, woods are made very durable. Thus by treatment with creosote, zinc chloride, etc., the hard but perishable beech and maples provide

force. Hickory, white oak, white ash and rock elm are all tough woods. By combining toughness with elasticity and relatively light-weight white ash stands above all others for farm implement handles, for vehicle frames, and now for the structural parts of airplanes.

Brittleness is usually a negative quality; it may be positive when a fracture is short and produces no long splinters as tough wood when broken always does. It is one of the qualities that make black walnut the preferred wood for gun stocks.

Elasticity is the property of recovering an original shape after deformation, and is usually a most valuable



THE STOCK DRYING ROOM

Showing oak and hickory spokes and elm hubs, at Oakland, California.

railroad ties of longer life than untreated white oak.

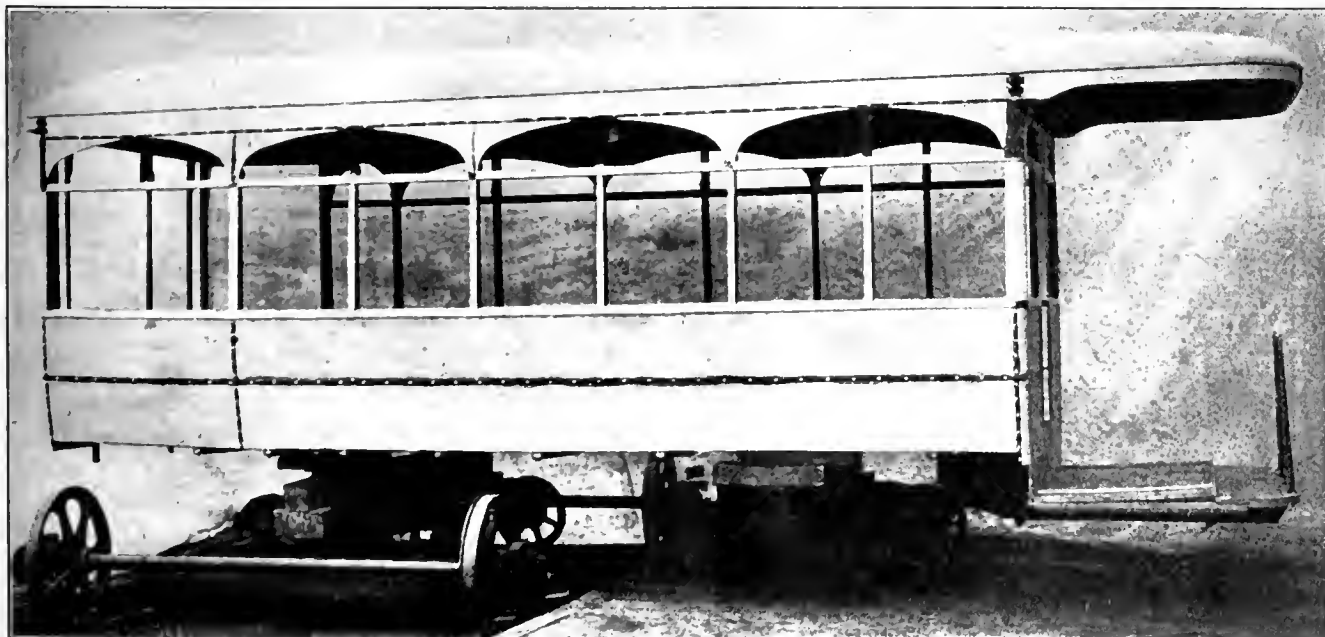
Toughness is the quality by which shocks and irregular strains are withstood. It is the opposite of brittleness and differs from strength and hardness. The classic example of toughness is a well-made wagon wheel. The hub of elm resists the strain of the spokes; the spokes of hickory carry the twists of traffic, and the mortised ends do not shear; the felloe of hickory or ash maintains its shape against every deforming



PRESERVATIVE TREATMENT

Brush treatment of telephone poles, showing method of application.

quality. Oak makes a poor wagon tongue because it is only moderately elastic and is apt to bend and stay bent; but it makes a fine ship knee because it is hard and strong, as well as tough and flexible, and when



THIS IS THE BODY OF AN AUTOMOBILE BUS

White ash was used for the framework and interior finish.

bent under pressure will keep the shape given it. Elasticity is found in flexible woods like ash and hickory and in stiff woods like pine and spruce. A floor beam should be stiff and elastic; a carriage axle should be flexible and elastic.

Flexibility-Stiffness: As an archer's bow so must the felloe of a buggy wheel be flexible, elastic and tough. For the buggy wheel hickory answers best; for the bow ash is chosen because it is lighter and does not "set" so readily. No one would choose a flexible wood for a bridge stringer, or for a car sill, but one which is stiff, strong under a load, durable and not too heavy.

Hardness is of importance when the service required of a wood tends to cut into it, or to wear it down. A railroad tie must resist the cut of the rail; a floor board not covered with a carpet must withstand wear. A door of soft wood is better than one of hard wood because it is lighter and hardness gives it no advantage. The best flooring is "quarter sawed" to show "edge grain" because that face wears better than a common face sawed "through and through." In ordinary carpenter work hardness is a disadvantage as it increases the labor required with no corresponding gain.

Shrinking: The wood that shrinks, or works, least is always preferable. A carriage panel or a table top that shrinks after it is finished will show an unsightly crack unless provision is made to conceal the contraction. Floor boards are made narrow partly to expose the edge grain, but chiefly to neutralize shrinkage. If an eight-inch board shrinks a quarter inch there is an appreciable space between it and the next. If the eight inches are covered by four boards the gap between each is only one-sixteenth of an inch.

Woods differ in this quality according to their struc-

ture, and for particular purposes must be chosen with reference to it. But apart from that the moisture content is of great importance. In some species the green wood may contain as great a weight of water as of wood substance. In any species seasoning causes the water to be evaporated and the wood to contract. In general the coniferous, or soft, woods shrink less than the hard, deciduous, woods.

Weight: Our common woods vary from 22 pounds (white cedar) to 53 pounds (hickory) per cubic foot — air dry. Where

strong timbers are to be used near the point of production, weight can be ignored. When cost as well as quality must be considered the transportation of a heavy wood handicaps it. But in some cases weight is vital: airplane wings, for instance, are framed of selected spruce because that wood possesses considerable strength and stiffness combined with extreme light weight. Ash likewise is a preferred wood where strength, toughness, elasticity and a minimum weight must be combined.

Other qualities, as *density, tastelessness, etc.*, are sometimes of importance. A tight barrel can be made of white oak, but not of red oak because the latter contains numerous open vessels or "pores." Containers and implements

used for food stuffs must be made of wood that imparts no taste. Thus butter tubs and oyster pails are made of spruce, or ash, or maple.

No user of wood doubts that its manifold qualities are advantages rather than faults, since only through them can the forest product, wood, be made to satisfy so many human needs—needs that range from the coarse, solid endurance of a railroad tie, through the soft, weather-proof, roof shingle to the light, stiff and strong wing of the mechanical bird.



WOOD WHICH TWICE OUTLIVED STEEL

White oak tie, side view. This tie was laid in the track during the year 1888. The steel has been changed twice since that time. The ties have decayed but little and will probably serve in a side track for four or five years. Plains, Montana.

One of the members of the American Forestry Association desires to locate a tract of about one thousand acres in New York State, within 150 or 200 miles of Buffalo, for hunting, fishing and vacation purposes. Valuable timber is not essential—cut-over land preferred. Information will be gratefully received and promptly forwarded.—Editor.

MANDRAKES; WILD LUPINE, AND NOTES ON THE AMERICAN SNAPPING TURTLE

BY R. W. SHUFELDT, M. D., C. M. Z. S., ETC.

(PHOTOGRAPHS BY THE AUTHOR)

SO FAMILIAR are the May Apples to every one who lives in the country where they grow, that a detailed description of the plant is hardly called for in this place. Then, too, the illustrations of it as shown in the present article, at various stages of its growth, furnish all that may be necessary to refresh the memory of those who fail to remember this most interesting representative of our eastern flora. It is generally called the Mandrake, or more rarely the Hog Apple, and still more rarely the Wild Lemon. Its generic name in botany is derived from two Greek words, meaning a foot and a leaf; and it is said that one of its earlier names (*Anapodophyllum*), bestowed upon it by Linnæus, carried this idea still further, for it likened the leaf to the foot of a duck. Professor Gray, however, claims that it referred to the "stout petioles," which hardly seems likely. Although Mandrakes may, as a rare thing, come up singly in the woods where they oc-

cur—or perhaps only a few together—it is the rule for them to appear suddenly in more or less extensive patches, often covering a very considerable area. Their appearance is quite simultaneous, as is their flowering and, later, their fruiting, to which may also be added their death in the autumn. In the North, the plant is not seen

until along in May; while, as we advance southward in the spring, we often find them up in the month of April in the District of Columbia, and still further south very much earlier. It is an abundant species throughout the entire range of the Gulf States, to include large areas in Texas.

When the fruit of the Mandrake ripens in the summer, children are extremely fond of eating it, the slightly acid and sweetish taste especially attracting them. By them it is sometimes called the "Umbrella Plant," and for the reason that the leaves "unfurl during April showers."

With respect to this Gray says that the "flowerless stems terminated by a



Fig. 1. WE HAVE IN THIS PICTURE A VERY BEAUTIFUL EARLY SPRING COMBINATION OF AN OLD JUDAS TREE (*Cercis canadensis*), WITH A PATCH OF MANDRAKES OR MAY APPLES (*Podophyllum peltatum*) BENEATH IT. THIS IS JUST BEFORE THE FLOWERS COME OUT.

Note the flowers of the Judas Tree, how they have blossomed out only on certain limbs of the tree—and that long before the leaves appear. They are bright pink and very conspicuous during the earliest days of spring. This particular tree is well known to many Washingtonians; it is on the right-hand side of the road as we approach the Pierce's Mill bridge.

large round 7-9 lobed leaf, peltate in the middle, like an umbrella; flowering stems bearing two one-sided leaves, and a nodding white flower from the fork." (See figures.) Upon first blooming, they are quite fragrant, and the pale green bractlets of the flower buds fall off very early. May Apples are perennial, their rootstocks being after the creeping order, and throwing off thick, fibrous roots; while the fruit, which is really a "berry," is many-seeded,



Fig. 2. THIS IS A VERY HANDSOME SPECIMEN OF THE MANDRAKE. SOME OF THE PETALS OF THE LEFT HAND FLOWER HAVE FALLEN OFF, THUS SHOWING THE FRUIT AT ITS EARLY STAGE OF FORMATION

Note on the right-hand side where a leaf has grown through an opening in a dead oak leaf that chanced to cover it on the ground where the mandrake started; it has strangled it, and that plant never came to anything.

and usually grows to become about two inches in length, the form being more or less ovoid or egg-shaped. We often find great patches of these Mandrakes growing in the rich soil on the banks of streams and creeks flowing through wooded areas; but then, again, an acre or more of them may cover some hillside, in a similar soil, where big trees of various species form a belt of timber.

Podophyllum has long been used in medicine as an efficient cathartic and for a few other purposes; however, modern physicians seem inclined to discard it. It belongs, with a few other plants, in the Barberry family (*Berberidaceae*)—in so far as the flora of the northeastern sections of the United States go. Twin-leaf, Umbrella leaf, Blue Cohosh, and Barberry are well known representatives of the same group. All of these occur in the

flora of the State of Virginia and in many places this side of the Mississippi River.

The leaves and roots of the Mandrake are poisonous, and children should be cautioned in regard to chewing them. The odor of the flowers is very disagreeable to some people; but then, tastes differ very materially with respect to the fragrance of flowers, and quite a long story might be written on this subject.

Mathews informs us that Mandrakes are never found growing wild in Maine, while the plant is rare in Vermont and New Hampshire; as we proceed further southward it becomes more abundant. Indeed, in the greater part of New England, its place is taken by the well known



Fig. 3. THESE SPECIMENS OF THE MANDRAKE ARE TAKEN *in situ* AT THE FOOT OF AN OLD OAK TREE

The plant in the foreground exhibits the fruit when it is about halfway advanced toward maturity. Other plants nearby had their fruit almost ripe upon them.

Skunk Cabbage, which, it must be believed, is by no means an agreeable exchange.

In the flower world of the eastern United States, we have another most interesting plant in the Wild Lupine, also called Wild Pea and Sun Dial—less often Old Maid's Bonnets. Aside from the matter of color, one may gain a very good idea of it by studying Figures 5 and 6 of the present article. A well-developed plant of this species may grow to become at least two feet in height; and

should twenty or thirty others of similar proportions be in the same group, the whole forms a picture that will live in the mind of the nature lover for many a day—nay, for many a summer to come. Sometimes its flowers are a pale pink, though rarely, and still less often pure white. They have been described as “butterfly-shaped;” but this is a bit far-fetched, as a glance at Figure 6 will prove. In arrangement they form a long raceme on an erect stem; the leaves are of a particularly fine green color, and of a compound arrangement, generally composed of eight or nine leaflets arranged in a circle. When the Lupine fruits, its four or five seeds are contained in a pod of some two inches in length; it is a hairy affair—broad and flat.

Lupine is generally found growing on gravel banks or gravelly hillsides, and sometimes on sandbanks that

advantage gained in the pea-shaped blossom? As usual, the insect that fertilizes the flower best knows the answer. The corolla has five petals, the upper one called the standard, chiefly a flaunted advertisement; two side wings, or platforms, to alight on, and a keel like a miniature boat, formed by the two lower petals, whose edges meet. In this the pistil, stamens, and nectar are concealed and protected. The pressure of a bee's weight as he alights on the wings, light as it must be, is nevertheless sufficient to depress and open the keel, which is elastically affected by their motion, and to expose the pollen just where the long-lipped bee must rub off some against his under side as he sucks the nectar. He actually seems to pump the pollen that has fallen into the forward part of the keel upon himself, as he moves about. As soon as he leaves the flower, the elastic wings resume their former position,



Fig. 5. THIS IS A BED OF WILD LUPINE (*Lupinus perennis*) AS IT FIRST COMES INTO FLOWER IN THE SPRING. IT HAS NOT BEEN DISTURBED IN ANY PARTICULAR, SO ITS BEAUTIFUL LEAVES AND RACEMES OF ELEGANT PURPLISH BLUE FLOWERS CAN BE APPRECIATED IN ALL THEIR GLORY

Lupine belongs in the Pulse family (*Leguminosae*)—a very extensive group of trees, shrubs and plants; it even contains the Judas tree, here shown in Fig. 1.

are utterly lacking in moisture. Should they remain undisturbed for several consecutive seasons, and the locality be particularly favorable to the growth of the plant, the group may eventually cover an area of fifty or sixty square feet—a wonderful sight indeed! It has a root that often finds its way into the soil for a distance of several feet—thus the plant is rarely taken up successfully for transplanting to gardens; so it is fortunate that it may readily be introduced through planting its fertilized seeds.

Speaking of its fertilized seeds, Neltje Blanchan has, with marked significance, described how this fertilization comes about in the flowers of the Pea family generally. It is most delightfully put, and she asks, “What is the

thus closing the keel to prevent waste of pollen. Take a sweet pea from the garden; press down its wings with the thumb and forefinger to imitate the acting of the bee on them; note how the keel opens to display its treasures, and resume its customary shape when the pressure is removed.” (*Nature's Garden.*)

Another interesting fact about wild lupine is that, in common with some other plants, it dozes off after the day is over. The leaves do not change position from an horizontal to a vertical one, as in other members of the legume group, but they twist about on their own axes—sometimes as much as through an entire half arc of a circle. This may be a diurnal trick as well as a nocturnal one—hence the term “sun-dial” applied to several of these

plants. Some of these movements are wonderfully complex, and must consequently mean a great deal to the plant possessing them. In this wild lupine the leaves fold themselves about the stem below, parasol fashion; or the reverse movement may take place, the leaflets extending upwards to close up and in line with the stem that supports them. A number of explanations have been put forth making for a solution of these phenomena; but the subject is too extensive a one to take up in the present connection. It is brimful of interest, nevertheless, and deserves to be carefully and exhaustively studied.

As a matter of fact, the study of the morphology of flowering plants and their physiology is one of the most fascinating lines of research in all nature. When one comes to think of it, the opening and closing of such flowers as our common morning-glories and allied *Convolvulaceae* is an extraordinary phenomenon. That it should take place only at night or on very dark days is a



Fig. 4. FULLY RIPE FRUIT OF THE MAY-APPLE OR MANDRAKE (*Podophyllum peltatum*).

Observe how the fruit stems spring from the point of the parting of the bases of the leaf-stems. The leaves themselves are of an elegant green, and the fruit is a rich yellow.

most interesting fact; and that the movement in closing is always in the same direction is another point worthy of close study. What is the necessity for the closing up of the leaves of sensitive plants and trees upon slight pressure from one's fingers, and then opening again in a little while? Why should the species referred to present such a remarkable habit, while it is seen to be entirely lacking

in others? Grafting and its results still hold many a secret not yet revealed to science, and the same is true of cross-fertilization. Indeed there is absolutely no end to the list of secrets still to be discovered through researches in structural and physiological botany, by those who devote their time and minds to problems of this nature. Much research work of this class has already been done; and doubtless, when the temporary checks caused by the war shall have ceased to exist, a great deal more will be undertaken.

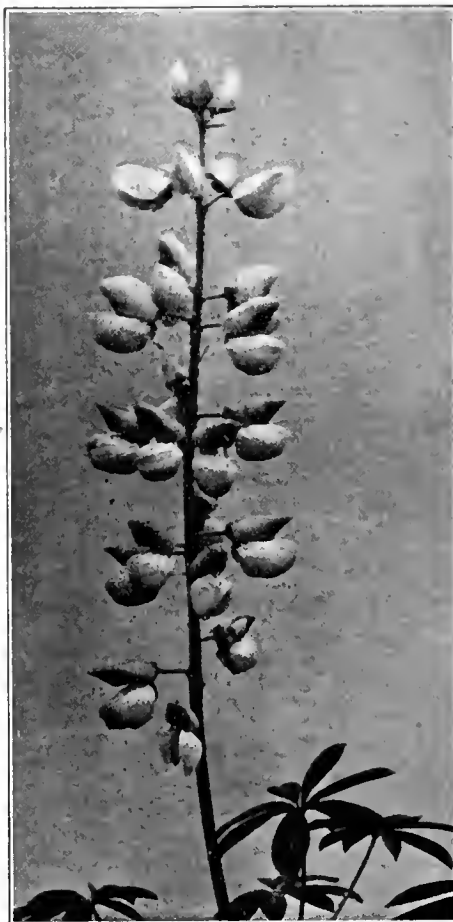


Fig. 6. A SINGLE SPIKE OR RACEME OF THE LUPINE IS ONE OF THE GLORIES OF THE PLANT WORLD DURING THE EARLY SUMMER MONTHS, IN THE REGIONS WHERE IT FLOURISHES

Lupine derives its name from the Latin of wolf, *lupus*, for the reason that superstitious people believe that the plant exercises its power to devour the soil's fertility.

NOTES ON THE AMERICAN SNAPPING TURTLE

To one who has paid any attention at all to our freshwater turtles, surely the common Snapping Turtle is no stranger. Two species of it is represented in the reptilian fauna of this country, and both belong in the family *Chelydridae*. Of these two forms the smaller occurs, in suitable localities, all over the eastern parts of the United States, and westward to the Rocky Mountains. Southward it ranges into South America, and may be found in many parts of Mexico and Central America, in which latter countries there is still another species which is not found within our borders. In other words, there are three North American species, or two in the genus *Chelydra*, and the big fellow known as the Alligator Snapping Turtle, which is the sole representative of the genus *Macrochelys*. These animals are the largest of our

chelonian species, especially the last-named, specimens of which have been taken that have weighed upwards of 140 pounds, or more. These are confined to the southern parts of the United States, in the sluggish rivers and swamps (*M. lacertina*), while our common snapping turtle, although very much smaller than the Alligator snapper, is considerably larger than any other United States chelonian; in fact, they are as pygmy and giant as compared with each other.

The present brief sketch will be devoted to our common Snapping Turtle, the scientific name for which is *Chelydra serpentina*. Captive specimens of this species have been in my possession many times, young as well as adults at various ages. Moreover, it has been studied in nature from one end of the country to the other; and

when opportunity has offered, negatives have been made by me from life. Prints from three of these have been reproduced to illustrate this account of its life and habits.

The young are generally dark brown on the upper parts, with a deep shade of ashy gray for the under parts. Older specimens are much lighter above and yellowish white beneath. There is considerable variation in these tints, however, while other characters are far more constant. For example, the under side of the tail exhibits a series of large shields, as compared with the scales of the Alligator snapper in the corresponding locality. On the back (*carapace*) of our snapper there are three longitudinal ridges—a median one, with one upon either side of it. Big snappers will come to weigh upwards of fifty pounds—rarely over forty in nature; and they have a length of shell that measures an inch or two over a foot. In some parts of the country, more particularly in New England, snappers are often kept in the “swill-barrel,” where they become inordinately fat and heavy, and are then said to make fine soup.

In young snappers the tail is very long in proportion to the rest of the body. Practically, this character is manifest throughout life, while, as in all aquatic chelonians, the feet are broad and paddle-like, and evidently adapted to powerful swimming. Snappers are unable to draw into the shell either the head or the tail; much less are they able to close the shell in front or behind, as do our well known land tortoises (*Terepene*). They are pretty tough, however; not easily observed in their native element, and vicious to a fault. Personally I have never met with a mutilated snapper in nature, while box tortoises are frequently found that exhibit the result of various injuries, the

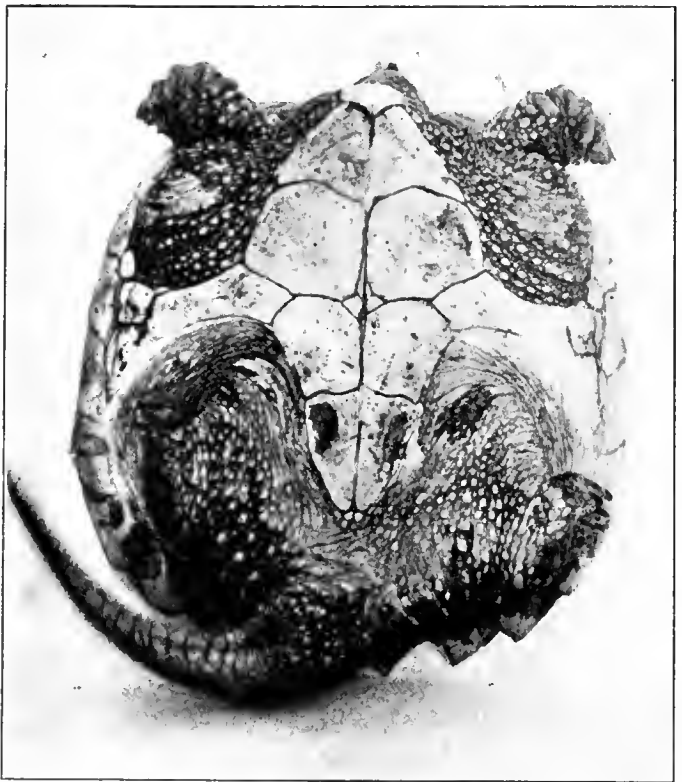


Fig. 8. HERE IS A MUCH OLDER SPECIMEN OF THE AMERICAN SNAPPING TURTLE THAN THE ONE SHOWN IN FIGURE 7. THE SCALES ON THE UNDER SIDE OF THE TAIL ARE PLAINLY SEEN, AS WELL AS ITS BIG, PADDLE-LIKE FEET

Observe the defenseless state of the body in this Snapper, and the peculiar formation of the small, elongate plastron, with its overlying plates of pale yellow.

majority of which have been at the hands of man. Snappers possess splendid powers of sight, notwithstanding the fact that their eyes are small, and probably their other senses are more or less well developed. In nature as well as in aquaria their backs often grow a great mass of dark green, wavy moss, which streams backwards as they swim along, and which is a source of great protection to the animal, in as much as it causes it to resemble a roundish, flat brown stone, having a covering of moss.

This species can remain under water for a long time; and when settled among the mud-covered rocks, in places where it is not too deep, it will stretch its neck out once in a long while, bringing the very tip of its snout out of the water, to take in a fresh supply of air. In such situations, too, it will patiently lie in wait for any hapless fish, duckling, or frog that may swim over it; and should it come within reach—quick as a flash its long neck is protruded, its unsuspecting quarry seized, drowned or killed, and subsequently eaten by this most voracious of chelonians. The bite of a large snapping turtle may be very severe indeed, especially should it succeed in getting hold of a finger or toe; for its sharp jaws can snip such a member off as clean as though done with an ax.

Should a snapper, lying in wait for food, find that nothing is

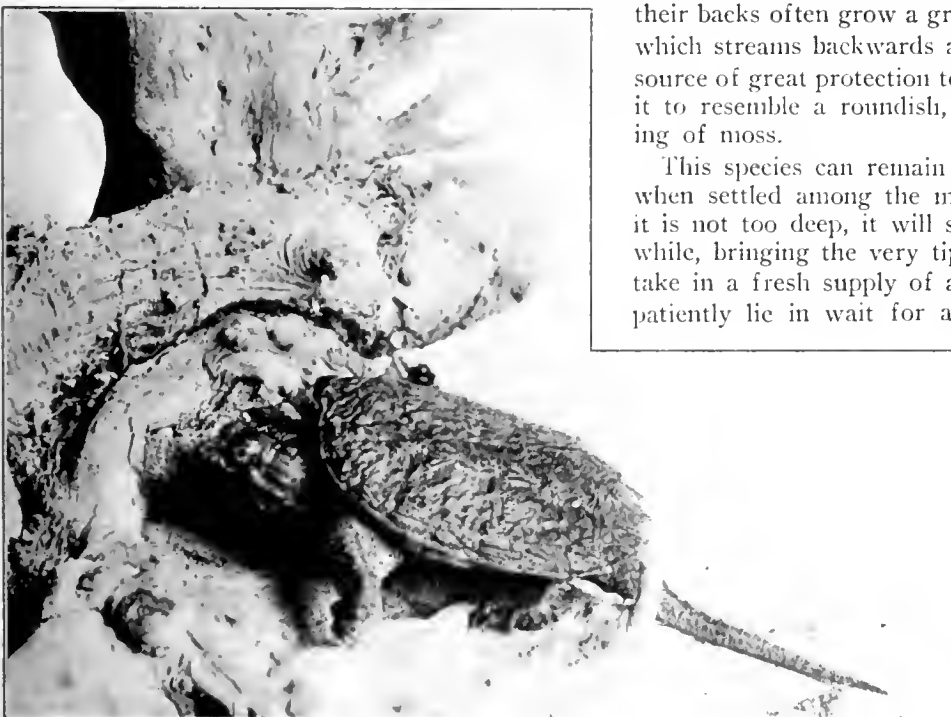


Fig. 7. THIS YOUNG SNAPPING TURTLE IS ABOUT SIX MONTHS OLD. NOTE THE GREAT LENGTH OF ITS TAIL AND ITS WONDERFULLY BRIGHT EYES

At this age the upper surface of the shell of the young *Chelydra serpentina* is dark brown, and very rough superficially.

coming his way, he will sally forth along the bottom of the muddy pond or sluggish stream in which he lives and capture such forms as he can. He has a wonderful control over the muscles of the neck and the lightning-like protrusion of the latter. Look out for your fingers and face while handling a big, healthy one; for not only can he thrust his head and neck forward in a straight line, but to either side and backwards over his shell as well. Indeed, the only safe way to pick one of these fellows up is in the same manner that we pick up a skunk—by the tail, though not, as we know, for the same reason.

There is a very great difference in the temperament of these turtles. Some of them become gentle in captivity and attached to their keepers, taking food from their hands and exhibiting other evidences of familiarity. Upon the other hand, other specimens remain as ugly and as vicious as those in nature, and will snap at anything or anybody within reach. They only feed *under water*; and many die in captivity for the reason that this imperative demand is either unknown to those who undertake to rear them, or it is otherwise ignored.

Their breeding habits are pretty well known, for their eggs have been discovered many times. In New England, along in May, the female becomes restless and eager to deposit her clutch of round, white eggs, that have thin, tough shells; she rarely goes further than fifty feet

from the stream or pond that is her home, usually much less. Having found a soft spot to her liking, she settles down in it by using her feet, trowel-fashion, upon either side of her. As she disappears by the earth closing in over her shell, she soon gets far enough out of sight to answer her purpose; and when so situated she lays her entire clutch of eggs, often to the number of a couple of dozen. Then, by a gentle, swaying movement, she works her way to the surface again, and in doing so, the loose earth falls back over the eggs, entirely covering them. In due course the eggs all hatch out, as do the eggs of other reptiles under similar conditions. When first hatched out, the young turtles are very dark colored and wonderfully cute little fellows, being frequently kept in aquaria, where they are, however, rather dangerous additions on account of their fondness for feeding on the other inhabitants. Upon hatching out, it would be interesting to know how these little chelonian tots find their way to their native element, for their size, strength, and range of vision

are all apparently totally inadequate to the accomplishment of such a feat. In some situations, a heavy fall of rain would probably help them out through the flood or overflow that would naturally take place, thus widely extending the usual limitations of the pond or stream wherein reside the parents of the otherwise helpless little crew.



Fig. 9. THIS IS THE SAME SNAPPER WHICH IS SHOWN IN A PREVIOUS ILLUSTRATION (Fig. 8). THE SHELL IS COMPARATIVELY VERY SMOOTH AT THIS AGE, AND ITS HORNY PLATES ARE WELL DEFINED.

It is interesting to note the way in which the head sags down far below the anterior margin of the carapace, when the animal is resting in this position. The generic name of this species, *Chelydra* (Kel-i-dra) is from the Greek, it having, in ancient time, been applied to a kind of tortoise or amphibious serpent; the specific name, *serpentina*, refers to its habit of thrusting its head and neck forward like a serpent when striking.

RAILS, GALLINULES AND COOTS

(Family Rallidae)

BY A. A. ALLEN

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

"THIN as a rail" is an expression that applies as well to any of the members of this family of curious birds as it did to the parts of Abraham Lincoln's famous fence. For the rail is a marsh dweller and nature has provided it with a compressed body like that of a flea, to enable it to slip better through the dense vegetation.

There are about 180 species in the family but only fifteen are found in North America, and of these only four or five are common even in the most suitable localities. By most people they go unseen and unknown, for unless one haunts the marshes, he is apt never to see one. When a coot or a rail meets with an accident on its migration and is picked up by the corner grocer or the editor of the local newspaper, it always causes considerable excitement in the community for it is usually diagnosed as a hybrid between a duck and a chicken, or, if it is one of the smaller species, a cross between

a snipe and a quail. All of the members of the family have rather long, stout legs like fowls, but their toes are always long and slender to distribute their weight when running over the soft ooze or the floating vegetation. The coot has lobes on each side of its toes to assist it in swimming, for it is much more aquatic than the other species and, like ducks, often assembles on the open water in large flocks. All species have longer necks than ordinary birds and much shorter tails, which, like domestic fowls, they hold erect. They resemble fowls

also in having short, rounded wings, but their feathers are longer and softer giving their plumage a somewhat hairy appearance. The gallinules and coots, and the sora, yellow, and black rails, have short, thick, pointed bills but the Virginia, clapper, and king rails have rather long, slender, and somewhat decurved bills.

The coot and the Florida gallinule, which are perhaps the best known members of the family, are sometimes called "mud hens" or "water chickens."

They are similar in general appearance, being uniformly slate color and about the size of bantams. If one cannot see the lobes on the toes of the coot, another good field mark is the ivory-white bill which in the gallinule is red and green. Both species have what is called a frontal shield, a horny prolongation of the bill on the forehead, which is not found on any of the rails.

In the gallinule it is bright red and quite conspicuous but in the coot it is brownish and much smaller.

When swim-

ming both species are quite ducklike, but their heads are smaller and they are continually jerking them after the manner of pigeons. When flushed they patter along the surface for a considerable distance before they rise but when fully on the wing, they resemble small ducks. Seen on land or walking along the border of a marsh, on the other hand, they do not resemble ducks in the least but appear more like busy little hens, picking at everything as they step along, lifting their feet rather high and putting them down carefully as though they were always



DUTY CALLS

The Florida gallinule or water chicken returns to its nest in the cat-tails. Note the conspicuous frontal shield or prolongation of the bill on the forehead.



"THIN AS A RAIL"

The bodies of rails are compressed like fleas to enable them to slip better through the dense vegetation.

sneaking up on some wary insect or luckless tadpole.

They are never so cautious, however, with their voices and some of the most startling sounds that ever come from the marshes can be traced to them. Their ordinary calls are somewhat hen-like: *cut-cut*, or *cak-cak*, but occasionally they give vent to a startling, *wup, pup, pup, pup, pup, pup, pup*, or *wup-wup-wup*. Like the rails they are especially noisy early in the morning and at dusk, and occasionally they break out in the middle of the night.

Coots and gallinules build their nests of dried rushes close to the water level in the marsh vegetation, the coot usually in



FINAL INSTRUCTIONS

The two Virginia rails are about to exchange places on the eggs and Mrs. Rail is giving the last word of caution to her dutiful consort before he takes his turn.



BACK ON THE JOB

The Gallinule is incubating and has ruffled its feathers to keep cool. The nest is built up from the water with dead rushes.

deeper water than the gallinule and in more open situations. Often they have to add to their nests during periods of high water to keep the eggs dry. The eggs are buff in ground color, rather evenly marked, the spots on the coot's eggs being smaller and blacker than on those of the gallinule.

The young birds are covered with black down when hatched, the coots being curiously ornamented with a fringe of orange whiskers. They are able to run and swim shortly after hatching and follow their parents about, hunting for food. It is an interesting sight to see a family of gallinules threading their way along the border of a marsh, the old ones continually calling and the young constantly peeping so that they will not get lost. As though to give the young something to follow, the old birds continually flash their white under tail coverts as they jerk along. At times the young get tired and crawl up on the back of the mother or again she calls them all to her and broods them for a while on little

platforms of rushes or temporary nests which she constructs.

In the southern states another species of gallinule is found. It is much brighter in coloration and thus gains for itself the name of purple gallinule. It is not so seclusive as the Florida gallinule and in shrubby marshes often climbs up on the bushes to bask in the sun.

Of the rails the commonest and best known is the Virginia rail, a bird about the size of a robin but of very different shape with its small head, long bill, and long legs. In general color it is dark brown, somewhat streaked on the back and redder on the breast, the flanks being barred with black and white. It is found even in small marshes, from the Atlantic to the Pacific, nesting from the Middle States to Ontario and British Columbia, and wintering from the southern part of its breeding range to Central America. It is often heard but seldom seen for it is rather difficult to flush even when one fol-

lows its notes out into the marsh. It seems to prefer to dodge through the thick vegetation like a mouse, sometimes when cornered, doubling back almost between one's feet to avoid flying.

The Virginia rail arrives from the south on its nesting grounds from the middle to the last of April when the marshes are still flooded and the new vegetation is just beginning to show green. Nevertheless one needs patience to find the birds even at this time though their notes are almost as frequent as the croaking of the frogs. The first notes heard in the spring are not very different from the spring call of the peeper but soon one hears a note that might be called its song. *Cut-a, cut-a, cut-a, cut-a*, or *racket, racket, racket, racket*, comes from a little clump of brown cat-tails, almost thin enough to see through and yet, try as one may, one cannot see the bird.



A LEAKY ROOF

But it serves to hide the Virginia rail from enemies that fly over head. The rails always pull the tips of the growing vegetation down over the nests in this way.

flew over the fence with the young ones and carried them further into the marsh.

A larger edition of the Virginia rail and much less common, except in some of the marshes of the Middle West, is the king rail. Its color pattern is almost an exact counterpart of that of the Virginia rail but it is almost twice the size. A much paler species but otherwise similar to the king rail, is the clapper rail, found only in the salt marshes. The clapper rails of the Pacific



A CAPTIVE COOT

The coot is sometimes called a "mud hen." Note the white bill and the lobes on the toes.

As soon as the vegetation grows high enough to afford some protection, nesting begins and the marshes resound with their cries even during the night. A hollowed platform of rushes is built in a clump of vegetation just above the water and the tips of the flags or sedges are pulled down until a sort of a roof is formed to conceal the sitting bird from enemies passing over head. The young rails are similar to the young gallinules but of course are smaller. They are able to run about almost as soon as hatched but if danger is near and the parent birds think they are not traveling fast enough, they do not hesitate to pick them up by any convenient appendage and hasten off with them. The writer once attempted to confine a nest full of young rails by placing an enclosure about the nest, but the old birds without the slightest hesitation,



A VIRGINIA RAIL AT HOME

Note the long, slightly decurved bill.



ON THE FENCE

This Virginia rail is about to carry its young out of the enclosure. Note the short rounded wings.

coast are somewhat browner than those of the Atlantic marshes and constitute a separate species.

The sora rail or sora is about the size of the Virginia rail but is more olive in general color with grayer underparts. Its bill is much shorter and heavier and is bright



IS THE COAST CLEAR?

A Sora rail sneaking up to its nest in the marsh grasses.

yellow in color. Indeed the bill is the most conspicuous part of the bird. Often when the sora is flushed, the bill is the best mark by which to distinguish it from the Virginia rail. In habits the two birds are very similar being equally difficult to discover and when finally flushed, both fly but a short distance with dangling legs and apparently feeble wings before dropping again into the marsh. It is practically impossible to flush either species

a second time. Indeed on one occasion when the writer was tramping through a rather extensive marsh, his attention was attracted by a yellow spot close against the water. Looking more closely, he discovered a sora rail crouching low and expecting to be passed unnoticed. So completely did it rely upon its protective coloration, that it permitted itself to be touched before it attempted to escape. The eggs of the sora rail are darker in ground



CARRYING HER BABY

The Virginia rail has picked up one of its youngsters by the leg and is hastening its departure from the vicinity of the camera.

color than the Virginia's and the downy young are ornamented with a tuft of orange whiskers on the chin and a brilliant red cere like a ball of red sealing wax above the bill.

There are two other rails found in the United States and Canada but both are rare. The yellow rail is some-



"WHOSE BLACK BABY ARE YOU?"

A young Florida gallinule only a few hours old.



A HOME IN THE MARSHES

This nest of a Sora rail is in a large plant of the Arrow arum.

what similar to an immature sora but is considerably smaller and can be distinguished by a white patch in the wing. The black rail is the smallest and least known of them all, being but little larger than a wren. Since it darts around like a mouse through the grassy marshes and is seldom flushed, it is scarcely ever seen even where it is nesting.

Rails on the whole are not very intelligent birds and because of their life in the dense vegetation have apparently become very short sighted. They are quick to detect motion but if one remains perfectly still, they will some-

times approach and even run over one's feet. With their short rounded wings and soft plumage, it is not to be wondered at that they prefer to run rather than to fly, but it is surprising to discover what long distances some of them traverse on the migration. Sora rails, for example, regularly migrate to South America and on one occasion, at least, a sora has flown across the Atlantic to Great Britain.

Rails, gallinules and coots are all considered game birds and are shot in considerable numbers, especially



Photograph by H. L. Sharp

A SORA'S PROSPECTS

Three of the eggs have hatched into little black powder puffs that are curiously ornamented with tufts of orange whiskers beneath the bill and drops of red sealing wax above.

in the South. The rails are very small, however, their flesh is of inferior quality, and they are such weak flyers that they furnish a very low grade of sport for hunters other than boys.

SOUTHWESTERN FOREST SUPERVISORS HOLD IMPORTANT CONFERENCE

HOW to obtain an accurate inventory of the timber of the Southwestern National Forests, to determine the extent of past cuttings, to secure growth and yield figures, in short to lay a better foundation for scientific management of the Forests, was one of the chief topics of discussion at the meeting of the fifteen supervisors and the district officers of the Arizona and New Mexico Forests, who met in Albuquerque, New Mexico, during the week beginning February 10th. A workable scheme for an extensive program of silvicultural management was presented and approved.

Many other problems of Forest administration, particularly those dealing with publicity, land classification,

education, game, fire protection and grazing were debated.

The timber sale business in the Southwestern district is large. In the fiscal year 1918, 121 million feet were cut under sale contracts, having a value of \$273,500.00.

At this meeting was displayed a device for more accurately determining the location of forest fires, invented by W. H. Gill of the Albuquerque office of the Forest Service. The device, called a cameragraph, is a proposed substitute for panoramic maps, which have been extensively used in both eastern and western Forests, especially in connection with the Osborne "fire-finder" in the northwestern Forests.

Forestry for Boys and Girls

by E. G. Cheney

THE PINE WOODS FOLK

SQUEAKY CHIPMUNK MAKES A DISCOVERY

By E. G. CHAYNEY



SQUEAKY CHIPMUNK woke up with a very distinct feeling of chill and decided that someone must have left the front door open. He did not tear up to the door excitedly to see what had happened as he ordinarily would have done—for the truth was that he was only about half awake. In fact he had been only half awake for several weeks. Ever since the snow had closed over the entrance to his house he had been sleeping most of the time when he was not eating. He had had some awful dreams of the food supply giving out before the snow melted.

"That's what it is," said Squeaky, suddenly wide awake at last, "the snow must have melted."

He gave one sharp squeak to his sleepy little wife and rushed up the narrow passage to the doorway. Sure enough, the snow was gone and the sun shone full in his face. The sun blinded him at first after the long weeks he had spent in the dark and he blinked contentedly in the warm sunshine without seeing much.

Slowly it dawned on Squeaky that he could hear a strange, rasping sound not so very far away. His curiosity was almost eating him up and he strained his eyes to look through that dazzling sunlight. Gradually things began to take definite form. At last he could see. Sure enough there was that old prickly porcupine eating all the bark off of one of those very Norway pine trees which Chatter Box's grandfather had planted. Squeaky was terribly excited.

"Hey, you old quill pig," he screamed, "Stop that right away!"

Porky stopped eating and listened a minute. He did not hear anything more and started to eat again.

"Did you hear what I said?" Squeaky screamed again as he hopped excitedly to a stub on the top of the old dead log.

Porky paused again and looked curiously around to see where the sound came from. He saw Squeaky and settled comfortably down onto a tiny little limb which did not seem nearly large enough to hold him and prepared to talk. He had not seen any of his friends for some time and he was quite ready for a friendly chat.

"Hello, Squeaky," he called down cheerfully, "did you speak to me?"

"Did I speak to you?" Squeaky shouted, tweeking his little tail angrily, "I screamed at you as loud as I could."

"Well," Porky said pleasantly, "you see I make so much noise know-

ing off this bark that I have a hard time hearing anyone else."

It was hard to stay angry with anyone who spoke so pleasantly and Squeaky began to feel a little bit ashamed of himself. He hoped that not heard him

"quill pig."

wondering," in a very dif-

ferent tone, "if you knew

Box's grand-

father planted that tree that you are eat-

ing up?"

Porky had

call him a

"I was

said Squeaky

ferent tone,

that Chatter

father planted

that tree that

you are eat-

ing up?"

"Is that so?"

said Porky

looking at the

tree with a new

interest.

"Yes," said

Squeaky, feeling

quite im-

portant, "he



buried a cone there and those three trees grew from it."



"Well, well, well," said Porky, "I guess it's the only good thing that he ever did." Squeaky felt a little taken back. "But you will kill it that way," he remonstrated.

Porky looked thoughtfully at the four feet of trunk that he had skinned. "I expect it will," he said indifferently, but I have to eat something."

"Why don't you eat some of those little popples?" Squeaky suggested. "They grow faster and no one would miss them. That tree there has been forty years growing up and you will kill it in three or four meals."

"That's a fact," said Porky, "I never thought of it in that way. I usually do

eat those small popples, but I saw old Longfang, the wolf, yesterday and he looked so hungry I climbed this big tree to sleep."

"Look out!" Porky shouted suddenly.

There was a rush and a vicious snap as Longfang's cruel teeth closed on the place where Squeaky had been. It was a narrow escape and Squeaky was huddled close up in the end of

the long passage with his heart pounding against his ribs. "After all, "he thought, "there are some people worse than old Porky, even if they do not eat trees."



THE PUSSY WILLOW

Said the fuzzy pussy willow,
As he ruffled in the breeze,
"I surely am the handsomest
Of ornamental trees.

"When the snow is mostly melted
And the flood is on the flats,
My kitten willow budlets
Turn to pussy willow cats."

SWAMP TREES

(Answer to Boy Scout Question No. 1 in January)

Our swamp trees do not as a rule grow in the stagnant swamps because they like it. They are there because they have the ability to exist under those unfavorable conditions where very few of the other trees could grow at all. That is, they have gone in there to escape competition.

The tamarack, the cypress, the black spruce and the white cedar are all con-

sidered typical swamp trees. But take those same trees out of the swamp and put them in rich well-drained soil where they will be protected from the competition of their stronger enemies and what happens?

They grow about twice as fast as they did in the swamp because the roots get plenty of fresh air. The swamp is an unfavorable location and no tree will do its best there.

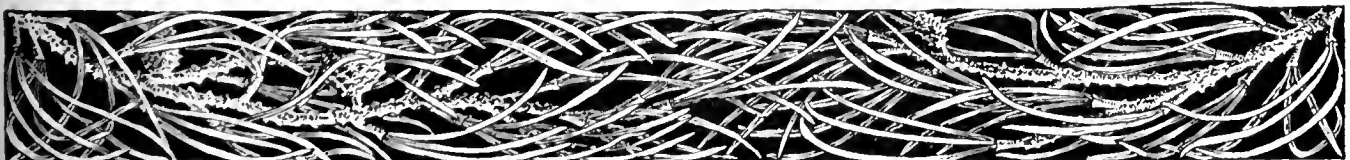
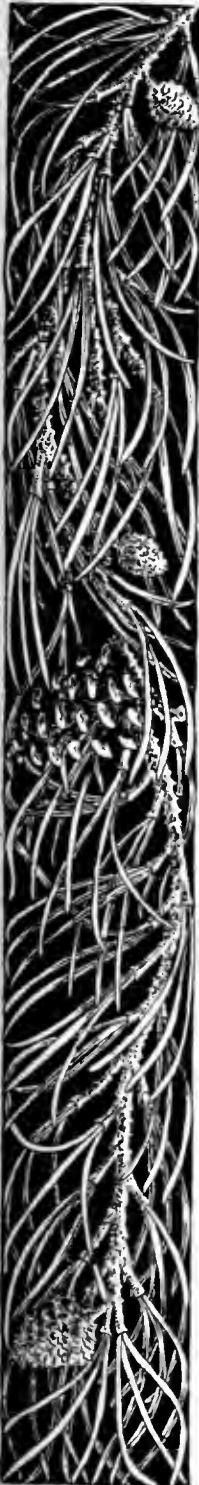
THE EFFECT OF SHADE

(Answer to Boy Scout Question No. 2)

You have probably noticed that when two trees are growing close together most of the limbs are on the outside and the trunks of the trees will be practically free from limbs on the sides next to each other. This is because the limbs are unable to grow in the shade. It is the same cause

that cleans the limbs from the trees in dense forests and makes them grow with tall clean boles, when those same trees if grown in the open and singly would probably have many limbs coming almost down to the ground.

This is true to a certain extent of all
(Continued on Page 1016)



DIGEST OF OPINIONS ON FORESTRY

WILL YOU NOT CO-OPERATE WITH US BY IMPRESSING UPON THE EDITOR OF YOUR
NEWSPAPER THE IMPORTANCE OF FORESTRY? WRITE TO YOUR NEWSPAPER

BOSTON HERALD.—The presence in Boston of the New England Forestry Congress reminds us of certain facts whose bearing upon the industries and prosperity of the land our people are only beginning to realize. The relation of forests to rainfall is a recent concept in physical geography. The older text-books contain but slight reference to the subject. Within the last quarter of a century science has reached the conclusion that the conservation of forests near the headwaters of great rivers is essential to preserve the fertility of the agricultural lands in the watersheds, to maintain the navigability of the rivers and prevent destructive freshets and to supply the waterpowers of which Mr. Harriman spoke in his address before the Congress.

Chicago Daily Tribune.—It is doubtful if there is in the whole Middle West a district that lends itself more readily to the purposes of a national park reserve than the dunes at the south shore of Lake Michigan. Why not the Roosevelt National Park in the dunes of Northern Indiana?

Chicago American.—If the Roosevelt memorial is to be in the forest preserve, why not have a forest for a memorial? Let the Park Commissioners set aside 500 or 1000 acres out of the 13,000 of the preserve and plant a great forest as a Roosevelt memorial.

Dayton News.—The Kiwanis Club, of Washington, has sent to every other Kiwanis Club in America a request to join in the planting of memorial trees for soldiers and sailors who lost their lives in the great war. Each Kiwanis in the United States is urged to see to it that a memorial tree is planted for every one of its members who died or was killed while serving in the Army or Navy, and it is understood that the recommendation has been received with general approval.

Grand Rapids Press.—"If the State of Michigan would simply enforce the law requiring railroads to keep spark arresters upon the smokestacks of their locomotives the northern counties would become reforested within 25 years," said a Kent circuit judge Tuesday. "The law is plain, and I have called the attention of certain State officials to it several times, but no action has been taken."

Jacksonville Times-Union.—In this State the law forbids the setting of fires, for any purpose, except between the first of February and the last of March, and all good citizens should try to have the law enforced. The fires allowed are only to be started after due notice to people living within two miles of the lands being cleared or pasture lands, and public sentiment is turning against any fires in the grazing lands.

Springfield (Ohio) Sun.—The idea of planting a tree for every soldier who died for his country, making an avenue of noble, living things, which shade the wayfarer for all time to come, is peculiarly fitting, and Springfield seems about ready to adopt this plan of commemorating the heroic sacrifice of her four-score and ten sons in the war with Germany. The idea of memorial trees would seem to make visible that glorious immortality for which every soldier laid down his mortal body.

Dallas (Texas) Journal.—The American Forestry Association has suggested that every community in the United States shall take steps to make its community Christmas tree permanent; that it shall use a living, growing tree for Christmas purposes; that trees for this purpose shall be planted and cared for. Millions of trees are ruthlessly destroyed at every Christmas season to serve unnecessarily a temporary purpose.

Huntington (Ind.) Herald.—Our American boys ought to be remembered with American trees—elms, maples, poplars, gums, sycamores, hickories, walnuts, pines, cedars, birches or one of the many others that will be both ornamental and useful.

Hillsboro (Ind.) Times.—Thousands of city streets and country roads can be made attractive at comparatively small expense for trees and the labor of planting, and the programs of the dedication can easily be made as impressive as those of Decoration Day. The plan also has merit in its possibilities of indefinite continuance.

Moline Dispatch.—Women of Moline, and some of the men, are becoming increasingly incensed at the cutting down of many of the city's beautiful trees—trees which it takes two human lifetimes to grow, and which are often of more benefit to mankind than are some men and women. It is averred by those most interested in the

beauty of the city that they are being cut down without legitimate reason or excuse. No one should be allowed even to trim a tree who does not know the business.

New Rochelle (N. Y.) Daily Star.—Senator Walter A. Law, Jr., has introduced a bill at Albany that will meet with the commendation of every lover of nature in the State. It amends the village law in relation to the planting, care and preservation of shade trees.

Christian Endeavor World.—Memorials to those that have fallen are a natural sequel of war. The question is becoming a frequent one whether stone and bronze furnish the most fitting monuments. There is a growing feeling that men ready to give their lives for their country would be most honored by being associated with something that is itself of service to their fellow-men. It is finding expression in memorial highways and bridges and parks. One of the recent suggestions is that the best reminder of a noble life should itself have life. The American Forestry Association has proposed that the heroism of our soldiers be commemorated by setting out trees. The reckless waste of our forests has awakened the nation to the need of systematic measures for replacing them. The value, as well as the beauty, of trees is becoming more appreciated. The observance of Arbor Day will doubtless be more general this year than ever before, and in many places it will be closely linked in thought with Memorial Day.

Boise News.—There is a good deal of discussion current about the type of monument to be built to commemorate the men who died for their country. The idea of planting a tree for every soldier who died for his country, making an avenue of noble, living things, which shade the wayfarer for all time to come, is peculiarly fitting. It seems to make visible that glorious immortality for which the soldier laid down the mortal body.

Ironton (Ohio) Register.—If the people of this country do not at once begin planting black walnut timber they will make the mistake of their lives. Now that the war has developed the respective values of foodstuffs, we are coming to understand what we have annually wasted in the walnut crop.

WALKS IN THE WOODS

(II) "AROUND ROBIN HOOD'S BARN" TO THE GRASSY SPRAIN WOOD

BY J. OTIS SWIFT, AUTHOR OF "WOODLAND MAGIC"

(PHOTOGRAPHS BY THE AUTHOR)

A GLINT of gold in the winter sunshine; filmy blue the mountains on the western horizon; a soft haze veiling the Hudson below us, and lazy fish-hawks circling in the ether above the Tappan Zee! The cobwebs of a week's work indoors tangle up our thoughts as we gaze out of the window here in the Manor at Hastings-on-Hudson. Let's get out in the woods and see if we can, perchance, snare the old enchantment once again. You'll come along, just to keep me company, and, too there's a world of interesting things to see over in the Grassy Sprain forest. The old Dutch settlers around Hastings stamped their hallmarks on many things. One was the little Grassy Sprain brook that runs down through Westchester County from up near Pocantico Hills, the home of Mr. Rockefeller, to the Yonkers reservoir.

As we go down an old colonial wood road to the Nepperhan Valley, starlings whistle sharply in the tall tulips and white oaks by Robin Hood's Barn. Robin Hood's Barn, you know, was the wild wood. The way to the silence and restfulness of Nature's laboratories is always "around by Robin Hood's Barn." When our modern philosophers talk of going into The Silence as something new, I recall the old monks and anchorites who used to seek out the woodland caves and rock cells in the fastnesses to commune with their Maker. The silence of the wood, as we go down this path, is so great one may almost hear the rhythmic beating of the big heart of Nature, to say nothing of the soft whispering gossip of black birch and hemlock rehearsing all the scandals of the jungle.

Downy woodpeckers and blackcap chickadees are busy over the grubs in the bark of the dead chestnuts. Neat, lady-like, gray-robed juncos flirt their two white tail-feathers like momentary glimpses of ruffled lingerie peeping beneath skirt bottoms in country dances, as we turn again into the woods off Jackson Avenue beyond Mt. Hope and come suddenly upon a wayside spring under the roots of a gnarled old beech. Revolutionary troops

passing between White Plains and Dobbs Ferry used to eat their noon-day lunch beside this spring. Over these picturesque hills were camped the French army under Count de Rochambeau in 1781 while he and Washington planned the Southern campaign. Some of the most celebrated soldiers of Europe may have stood on the greensward here. Harvey Birch, the American spy, often drank from this pool, and no doubt Washington Irving, who knew every bit of the countryside hereabouts, drew mystic fancies from the shadowy depths where the water

sank away under the mossy bank and crawling beech roots. The beech is covered with deep-cut initials, and some thoughtful soul has carved, right over the drinking place, *Pro Bono Publico*—for the good of the people.

As we sink our lips in the cold water a speckled trout darts out from a recess under the bank, flashing his red-gold spots for a moment in the shaft of sunlight, and is gone. He has been a willing prisoner since the high water last Spring. Pincushion, lichen, and fairy-cup moss is pleated over stone and wet earth. There are deep fern-festooned crevices where it is not hard to imagine that on moonlit nights little old men—gnomes and brownies with frogskin breeches and milkweed-silk doublets,



AN OLD COLONIAL WOOD ROAD BY ROBIN HOOD'S BARN

come out to dance with the laughing, frolicking, thistle-down clad naiads and fays from the bullrush fens near the brook below.

You should come along this brookside path from the spring—worn by who knows what lagging feet of hoboes, Ishmaelites and lovers—on a moonlit summer's night when the underbrush is aglimmer with the mysteries of glow worms, lightning bugs or phosphorescent wood, and a-whisper with the love-songs of crickets, locusts, cicadas and katydid. Above are the great cathedral arches made by reaching arms of elm, yellow poplar, oilnut and red oak that fill the imagination with strange, incomprehensible throbs of emotion originating in the primordial days when you and I—who knows—instead of

plodding through brake and pink azalea by the brookside, would have been up there sweeping gracefully over yawning, moonlit depths from limb to bending limb and throwing down nuts and sticks to tease the savor-toothed tiger and cave bear lurking in the shadows.

There is no snow on the ground just now, and we are struck with the beautiful precision with which each sharp awl-like skunk cabbage, green or purple, sticks up through the frosty mud by the brook. This skunk cab-



A PICTURESQUE AND INVITING WOOD PATH IN LATE WINTER

bage, blossoming among the snowbanks and mud-flats in January, is the first flower of Spring, undoubtedly.

What a jungle there is here in the bottom land of black mucky loam! Christmas ferns, Maidenhair ferns, rock ferns, brakes, sarsaparilla, jack-in-the-pulpit, moonwort, snakeroot, pinkster, feverbush, sassafras, and dogwood, all growing year after year, dropping withered leaf and sere stalk back into the mixing bowl to rot and form that wonderful black surface soil that is the fertilizer of the great old forest trees towering above. This is Nature's kitchen where she kneads over and over the earth-stuff for reincarnating her little plant and mighty tree folk. It is her laboratory, workshop, her hospital where she performs miracles of surgery and resuscitation. We reach down among the decayed, lichen-covered roots of an ancient hemlock stump and take up a handful of this wonder-working black loam and ponder over it. It is so clean we would not hesitate to taste it—and yet it is the decay of centuries here in the forest, centuries of bird, animal, insect, plant and fungus life. It is the

stuff that once may have been the bloom on the cheek of an Algonquin maid, or the delicate veining in the lip of the white violet, the tough heart of many an oak or chestnut, or the taloons of eagle or fishhawk. It's the dough from which all this loveliness about us was fabricated, and, after a fashion, from which we, ourselves, came. It comes the nearest to being the mysterious Philosophers' Stone of the Magi, for it is one thing that, with careful conservation and manipulation, turns everything to gold. It is the foundation of the forests which are the foundation of the wealth of the peoples.

Note for a moment the fallen timber in this little patch of wood. There are similar patches all over America. When I visited John Burroughs on his eighty-first birthday the country was anxious about the fuel supply, to get it through the season of 1917-18, and Burroughs agreed with me that if the fallen wood in the forests of



UP AMONG THE GREAT LEDGES THE FERNS ARE STILL GREEN

the eastern states had been gathered it would have gone far toward keeping the Storm King out of the sitting rooms of America that winter. Of course there is the labor problem—but take an old hay rack and a dozen children down any picturesque wood path in Autumn and see how quickly it can be filled with wood-knots and bone-dry limbs that crumble naturally into castles of coals in the open fireplace, and bake apples such a candied brown on the hearth in front. Clearing up the under-

brush gives young trees a chance, avoids forest fires, and obviates the necessity of cutting down many live trees for firewood.

A tree has such a personality, a possibility for vast good to the race to be considered, that no one should cut it down without due thought and care. When we have learned to respect our forests as we do our livestock, America will have laid the foundations for solving many a tragic economic problem looming so darkly now. Mankind in his primitive days lived in the forests. He fled there for protection as to a mother in his infant centuries. Robin Hood sought sanctuary there. The hunted outlaw flees him to the greenwood tree. You and I are out here today for rest and comfort in the strength of the forests. When we in America have spent our rich inheritance in thoughtless living, our streams are drying up, and the desert stretches across the continent without the voice of bird or animal, and our fields are running out—we'll return to the protection of the forests as once they protected and cared for us, or we'll go the way of Tyre, Sidon, and the dodo. Not only must we protect the Adirondack forest, the great national parks, the White Mountains, but also every little woodlot all across the country like this at the Grassy Sprain.

Right here on the edge of the bog, among the grass-roots, ox-eyed daisies and buttercups, last Spring, I found the round leaved orchis, though it does not grow commonly back in the bog where the marsh marigold, the cowslip, grows. I took it home for my wild garden and expect great things of it next Spring. Incidentally it is interesting that so many beautiful denizens of the wild wood grow in one locality and do not appear in some other close by. The wake-robin grows everywhere along the Palisades on the west side of the Hudson, for instance, but I have never found it in Hastings on the east side of the river.

While I am taking you along the State road to show you where the watercress grows under a bridge in the Sprain brook, and where the closed gentians are the color of the bluebird's back in Autumn, where in the deep woods the box turtles lie luxuriating in the cool edges



LOTS OF FALLEN TIMBER IN THIS LITTLE PATCH OF WOOD

of the swamp on hot summer days, I want to tell you what I heard of the conversion of a very dyspeptic, cross, material-minded man whose boast it was that there was nothing in the world that couldn't be understood by his common sense, and that he was from Missouri, anyway. He was told by his physician that if he didn't get out into the woods for a summer, he would die. He didn't want to die, somehow, and so he came out here into the Grassy Sprain forest, grumblingly and complainingly, as a man going to his grave or a prison. In a juniper grove where the gray squirrels woke him every morning with their peculiar scolding, he lived all summer in a tent with only the great shagbark hickories, white oaks, hemlocks and junipers for companions. He went almost naked in sunshine and rain, cooking his own food like a hunter, and when he went back in the Fall, the color of a brown nut and with added chest expansion, he had not only

regained his bodily health, but his boyish heart and a close knowledge of the habits of all the birds, animals and trees. What seemed to me more important, though, was that through the long evenings sitting in his hammock by the campfire and listening to the music of whip-poor-will and veery, he had gained a suspicion that there were, perhaps, in the mystic pathways where rabbits fitted silently; in the caves under mossy stumps, and in the moonlit spaces along the brookside, tribes of eerie Little People who

spent their days painting the delicate tints into the jewelweeds and dogtooth violets, and coloring the pink mushrooms and fungi, and their evenings dancing, probably, on mossy stones up among the great ledges where, as we pass, we find the Christmas fern still green this winter day. I don't say he believed these things, mind you, for who really knows? But when he went back to the town in the Autumn he was no longer sure there were not things in the world that he had never seen with his two cold, disbelieving eyes. That very suspicion, that there might be things he didn't know about, filled his mind with a new and delicious delight, a sense of baffling mystery, and started it growing again. He had found a new interest in living, and, more important, in dreaming, and he was no longer a cynic.

THE first school of practical forestry in Scotland was recently opened at Birnam, in Perthshire. The school building that has been erected at Birnam is itself an example of what can be done in forestry, being entirely built of home-grown wood. At present the school has twelve students. The course will cover two years

and will consist of both practical work and lectures. The Duke of Athol has placed his woodlands at the board's disposal for practical instruction and the aim of the school is both provision of technical instruction and the furnishing of openings for discharged service men.



A Beautiful English Walnut Tree in Washington's Garden, Mt. Vernon.

The Great Washington

probably did not know that an acre (50 trees) of

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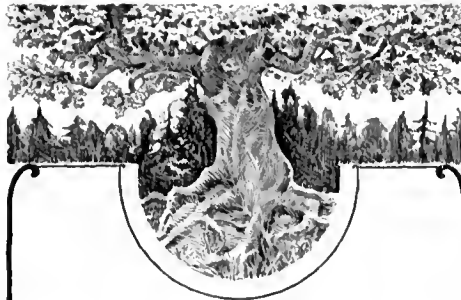
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SELL FUEL WOOD BY WEIGHT

WOOD for fuel should be sold by weight instead of by cord measure, for the heating value depends not upon the bulk of the wood but upon its weight, say foresters of the United States Department of Agriculture in Bulletin 753, recently published. A pound of dry wood of one species has about as much heating value as a pound of any other species, but two cords may vary 100 per cent in their value for heating.

It is the custom to sell hardwoods and softwoods at slightly different prices because of differences in heating values. This is only a superficial classification, however, as two species of hardwood may have heating values widely different. Where hardwoods and softwoods are mixed together without regard to the proportion of each, the values may be so different that one man may, for the same money, buy twice as much heating value as another. The shape and size of the sticks may also cause great variation in the actual amount of wood substance, and therefore of fuel. If weight were the measure, the species, shape, and size of sticks would make little difference, provided the wood were thoroughly seasoned. It would be necessary, however, to fix certain standards as to time of seasoning of wood, the specialists say.

The bulletin points out that there is special opportunity for greater use of wood for fuel in New England, New York, New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Iowa, Missouri, and the Lake States, where there is a rural population of about 20,000,000, which is estimated to use annually 18,000,000 tons of coal. A considerable proportion of these fuel users will find wood available close enough to their own neighborhood to make long freight hauls unnecessary. By turning to wood they will not only conserve the fuel supply and relieve transportation, but are likely to contribute to the prosperity of their own community. For one thing the opportunity to sell wood fuel would tend to encourage the improvement of farm woodlands by proper thinnings.

An increased market for wood fuel should open up good opportunities for operators of thrasher and silo-cutting outfits or others who have gasoline or kerosene engines to do custom sawing during the winter, according to the bulletin.

The bulletin contains many suggestions as to how to develop and handle the woodlot to the best advantage. How to produce wood, how to sell it, and how to use it are all covered in a practical way.

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"LONG Life for Wood at Low Cost" is the name of a valuable booklet which has just been published by the Barrett Company. It treats in a very practical and thorough way of the protection of wood from destruction by decay and insect attack through the application of creosote oil and it tells of the simplicity and ease with which this preservative may now be used.

FLOWERING FRUITS

Any flower lover who wills to make his grounds beautiful in early spring with the "flowering fruits" does not go far astray. Their greatest loveliness shows when their dainty blooms contrast with evergreens, or the shrubby border's new-born foliage. Then you will be glad you planted ten or a hundred of the double-flowering Apple, which is a fleecy cloud of red, pink, and white; or the flowering Peach, or the Japanese Quince, or the Japanese Cherry with blooms like "little paper roses."

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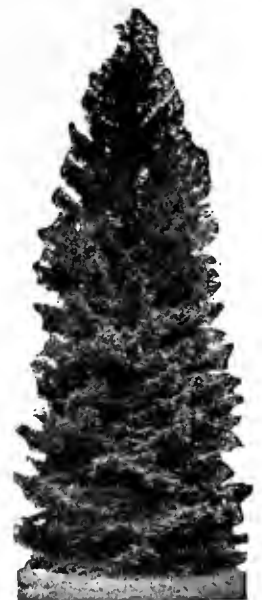
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Some Government War Secrets

—and the reason for the Victory Liberty Loan

"WE HAD promised the Allied war-chiefs that we would have in France by July of last year, 600,000 men. On that date we had a little over 1,900,000. We had behind them nearly 2,000,000 in this country under training who would have been on the front before July, 1919, and we had behind those 4,000,000 men as many more men as were necessary to do the job.

"Four million men in France meant at least 20,000,000 tons dead weight of shipping to take care of them, and we had that program under way and were making our maximum output just about the time the armistice was signed. Twenty million tons of shipping at present cost means just about \$4,000,000,000 or a little over.

"Did you know that those 2,000,000 men in France, who did so much to bring the war to an end, had only one small battery of American-made artillery behind them; just one battery of 4.7 and a few big naval rifles! The rest of the artillery used by the American soldiers was made by Frenchmen in France. But, on the way was a great stream of guns and shells that would have blown the German army off the earth. But that stuff had just come into large production in November, 1918. And it is for the deliveries on that big peak production that we have to pay in December and January and will have to continue to pay for in February."

* * *

"Our program for tanks, of which few got into action, was, I have been told, to provide for a tank in 1919 for every 75 feet of the front."

* * *

"Those are some of the things that cost money, and practically none of those great supplies of artillery, of shells or tanks, even of ships, practically none of that stuff was ever used. What an awful waste! We are asked to pay for a dead horse that never drew a load! It is discouraging, paying for something that is no good!

"Well, let's see if it's any good. Do you realize that the German army was never really routed; that except for a little bit of a stretch down in Alsace-

Lorraine it was never fighting on German soil? They were brave soldiers, the German soldiers. They still had millions of them on the Western front. And yet they surrendered while they were on foreign soil. They had a fleet which had required years and years and years to build and it flew the white flag without firing a shot."

* * *

"I cannot believe that these great stores of munitions were wasted. In addition to the bravery of the American doughboy that arrived in France and got into action in numbers about the 15th of July and turned the tide and drove the Germans back, in addition to his bravery and his almost reckless spirit of determination, for which the praise cannot be too high, I say in addition to that, I believe there was one other factor that brought this war to an end at least one year before the most optimistic of us had dared to hope for. One other factor, and that was that Germany, her general staff, knew that back of the few hundred thousand Americans that really got into big action, and back of the 2,000,000 in France, was another 2,000,000 ready; and despite the fact that we had practically no artillery of American make on the Western front, that there was a great stream of American-made artillery on the way. And it is my conviction that the German staff knew that if they prolonged the war into 1919, they were inviting, not certain defeat, but certain annihilation."

* * *

"We are asked to pay for things that were never used; we are asked to pay for shells that never were fired; for cannon that never reached the battlefield, but we are asked to pay for those things that helped in a major way to bring this war to an end in 1918 instead of 1919. And the bringing of this war to an end twelve months before we could logically look for it means that we are asked to pay for saving the lives of 100,000 or 200,000 American boys who would have died on foreign soil had the war continued another year."

—Extracts from a speech by Hon. Lewis B. Franklin,
Director War Loan Organization, U. S. Treasury Department.



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BY ELLWOOD WILSON

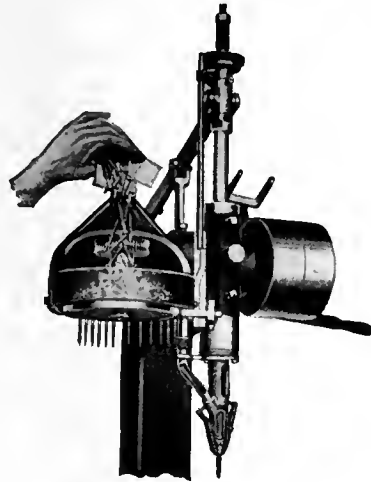
PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

THE most important event from a forestry standpoint of the past month was the meeting between a committee of the Quebec Limit Holders' Association, some members of the Woodlands Section of the Canadian Pulp and Paper Association and the Hon. Jules Allard, Minister of Lands and Forests. This meeting discussed with the Minister the advisability of planting on government lands held under lease and ways and means of accomplishing reforestation. The concensus of opinion was that reforestation was a pressing necessity and that the government should bear some of the financial burden of such work. The Minister said that he was quite willing to consider any plan which the Committee would bring forward and would, when such scheme had been approved by the Committee and himself, bring down the necessary legislation. Ways and means are now being considered and the Committee will shortly meet to discuss the subject in all its different aspects and decide on what shall be presented to the government. The ravages made by a fungus disease on the balsam are becoming so serious that in a short time the present stand of this species will all be affected and it will not be possible to cut it. As it forms about 60 per cent of our total soft wood stand this will cut the length of time for which we have sufficient wood in two. The only means for combating this disease that seems to be known is to burn the debris from logging and gradually try to clean up the woods. This would have the added advantage of reducing the danger from forest fires and also the cost of fighting them but would increase the cost of the wood.

An active interest in reforestation is being taken by the larger and more progressive paper companies. The Laurentide and Riordon Companies have been planting for some years and this year the Price Brothers Company, The Abittibi Company and the Belgo-Canadian Company are making plans to commence. Such progress is indeed noteworthy and speaks well for the future of our timber supply.

A standardization committee, consisting of the Managers of the co-operative fire protective associations, the Manager of Dominion Parks, a member of the Forester's staff of the Railway Commission and a member of the Dominion Forestry Branch, together with the Foresters of Ontario and New Brunswick, has been formed which will try to correlate and standardize fire protection methods and to develop new and improved means for fighting fires. This is a long step in advance and will certainly bring good results and increased efficiency.

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The Annual Meeting of the Dominion Conservation Commission was held in Ottawa in February and reported progress along forestry lines in all parts of the Dominion. Especially encouraging was the report on the research work completed during the past season and the large program for the coming summer. The Provincial Governments and private firms are co-operating both with financial help and through their forestry personnel. The information being obtained is absolutely basic and is necessary before we can make any intelligent plans for handling our woodlands in the future. Permanent sample plots have been laid out where questions of growth, future yields, insect and fungus injuries, effect of slash disposal methods, reproduction on old burns, and the effect of different methods of cutting are being carefully studied. Plots have also been established for the study of planting under different conditions of soil, number of trees, various associations of species and other important questions. The effect of the drainage of swamp areas on tree growth is also being studied. In one section a permanent camp for the housing of personnel and equipment has been constructed.

Messrs. Rohson Black and Ellwood Wilson spoke at the Forestry Conference held in Boston, under the auspices of the Boston Chamber of Commerce, February 24 and 25.

A. C. Volkmar, who has been for some years the Forester of the Riordon Paper Company and has put their forestry department on a splendid basis, has taken a position with the Canada Paper Company. He will have charge of the mapping and estimating of their new limits and will prepare a working plan for their exploitation.

Lieut. H. G. Schanche, who left the Laurentide Company to enlist in the avia-

tion section of the U. S. Signal Corps, has been discharged and has again taken up his duties with the Laurentide Company.

Sergeant Arnold Hanssen, of the Canadian Society of Forest Engineers, had a very narrow escape just before the signing of the armistice when a shell splinter or machine gun bullet went through his steel helmet. He has been taking a trip through southern France and Italy and expects to visit his people in Norway before returning to Canada.

There has been a great shortage of timber in South Africa during the war and but for the foresight of the early settlers the situation would have been very serious. It is felt that a vigorous tree planting campaign should be undertaken. The railways have already done some work along this line. They now have 55,504 acres under management, of which 23,532 acres have been planted. The oldest are sixteen years of age and are already yielding marketable timber from which a considerable revenue is obtained.

The Canadian Forestry Association is entering a new year of usefulness with 8,000 members.

A new company, the "Norske Kemikalier" with a capital of half a million dollars, has been formed to produce medicinal and chemical compounds from the destructive distillation of wood. The principal material is fir tree roots.

There is at present some inquiry for Canadian timber lands from England and Norway and some sales have been made.

The International Paper Company which owns some two thousand square miles of timber limits in the St. Maurice Valley, are

Note two trees in this row missing. Compare size and appearance of trees with those at the right, planted in blasted beds—*drawn from photograph.*

Row at left in spade-dug holes—at right in blasted beds. Orchard of George W. Brown, Mt. Cory, Ohio.

Trees grow faster and stronger in BLASTED beds

“I found that trees planted in beds blasted with Atlas Farm Powder did twice as well as those in spade-dug holes,” writes J. J. Funk, Webb City, Mo. “1200 trees and 400 grape vines planted in blasted beds grew more in a year than others in spade-dug holes had grown in three years,” writes F. M. Reeder, Charles Co., Md.

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about to commence the erection of a large paper mill at Three Rivers, Quebec. It is said that they will spend about six million dollars. This addition to the mills in this valley will make it one of the most important paper producing sections in the country, and will be a great addition to the industries already operating in Three Rivers.

A delegation consisting of Sir William Price, Brig.-Gen. J. B. White, D. S. O., and Ellwood Wilson, with other members still to be announced, went to Ottawa on March 18 to impress upon the government the necessity of using returned soldiers for reforestation work. In the opinion of General White, there is no other work so well suited to those men who have been gassed or shell shocked. He estimates that there are about fifteen hundred such men to be cared for. The Dominion and Provincial Governments have large areas of lands which could be planted and also nurseries from which stock could be supplied.

The general opinion of all those who have observed its results, is that in the

forests of eastern Canada, the diameter limit has been worse than a failure. Its effect has been to take out the best trees and leave all the poor ones. It was always supposed that the smaller trees left would grow and produce a second crop but it has been definitely proved that most of these are suppressed trees which rarely take on any new growth after the removal of the larger ones and then only after some time. If the stand is opened up appreciably almost all of them blow down. The removal of the spruce has encouraged the reproduction of balsam and now that the balsam is being heavily cut the forests are rapidly becoming almost pure hardwood stands. It is hoped that some other method of regulating cutting in our forests will be developed. The Quebec Government already has made arrangements by which a license holder can ask to have a forester examine the land he wishes to cut, and if in the forester's opinion, some other method of cutting than that laid down in the regulations would be better, he may give permission. This is certainly a step in the right direction.

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FORESTRY FOR BOYS AND GIRLS

(Continued from Page 1007)

trees, but some species are able to stand much more shade than others. Those with a dense, heavy foliage—that is those that make good shade trees—can stand more shade than those with less dense foliage. The sugar maple is a very good example of the former and the ash of the latter.

Consequently, when these two species, the sugar maple and the ash, happen to grow side by side, the light shade of the ash has very little effect on the growth of the sugar maple, while the dense foliage of the sugar maple is almost sure to clean all the limbs off of the near side of the sensitive ash.

QUESTIONS FOR NEXT MONTH

(1) In a dense stand of basswood, maple and hickory, what species of young growth do you find?

(2) What hardwood tree has a bud with a decided hump on the side of it?

WHAT THEY SAY

“I have read with great satisfaction the article by Dr. Shufeldt in AMERICAN FORESTRY on budding leaves. The fringe tree especially interested me. Thank you for giving me so much pleasure in these cruel days.”—*Dan F. Bradley.*

“We are now furnishing your magazine to one of our Log Camps, and two of the individuals of our company are also subscribers. This is a good magazine and we get a good deal of pleasure from reading it.—*P. R. Caray, Vice-President Camp Manufacturing Company.*

“I have been greatly attracted by your series of articles and the excellent photographic illustrations in AMERICAN FORESTRY.”—*Homer D. House, August 15, 1918.*

“Let me thank you for having sent to me the copy of AMERICAN FORESTRY containing Dr. Shufeldt's charming article on pictures and plants for Christmas. It always does me good to read things like this.”—*Waldemar Kaempffert.*

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REFORESTATION of Louisiana and conservation of those forests already standing in the state is the purpose of a popular movement which has been inaugurated through the efforts of R. D. Forbes, superintendent of Forestry for Louisiana. An association has been organized, and one of its chief purposes will be the promotion of public sentiment in favor of the utmost co-operation in the prevention and suppression of forest fires.

Mr. Forbes believes that one of the chief causes of waste in lumber building mater-

ials is forest fire. The state still has extensive areas of forest, and it is the plan to save as much as possible of them for the uses of industry and the public through an active campaign against forest fires.

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Mr. William J. Butler, general manager of the Board of Commissioners of West Park, Joliet, Illinois, a few years ago read in the magazines that dynamite was great stuff to use in preparing holes in which to plant young trees. But he was a conscientious man, and did not feel it would be right to try out experimental ideas in the public park, which was entrusted to his care, so he determined to test it in his own private orchard.

He ordered from a nursery some Early Richmond cherry trees, some Siberian crabs and several other varieties of apples and decided to plant them in blasted soil.

But, realizing the need of something to compare with, in order to see just what the advantages might be of the new method, he induced some of his neighbors to order some of the same stock, from the same nursery, and plant it at the same time, in soil of similar characteristics, in spade-dug holes.

Mr. Butler says the tree holes on his place were blasted with half sticks of dynamite. The neighbors dug their holes in the good, old-fashioned way.

All the trees were two-year-old nursery stock. Three years after planting, Mr. Butler writes:

"My trees are actually twice as large, and look healthier in every way. I had plenty of cherries and crab apples this season, also some other apples, while there was not the sign even of a blossom on the trees planted in the undynamited soil. Trees on both places have had practically the same care, so I am satisfied in my own mind that the difference in growth is due entirely to the different modes of planting.

"All I knew about dynamite as used in tree planting was what I had read in the magazines, and I was merely experimenting when I planted my trees. But I want to say now that if I had 40 orchards to plant not a tree would be set out that was not in a dynamited hole."

Evidently Joliet citizens residing near West Park may be expecting to be treated to a little display of fireworks the next time any trees are to be set out in the park. If Mr. Butler will do the planting on the 4th of July it will be unnecessary for the boys of that neighborhood to invest any money in firecrackers to fittingly celebrate the glorious day that typifies our independence.

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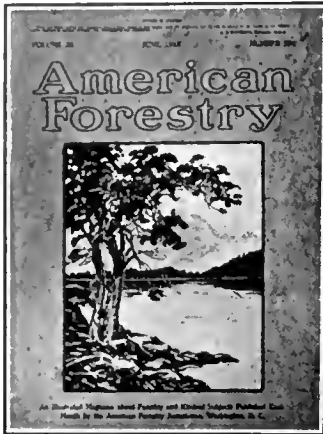
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AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

MAY 1919 Vol. 25

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THIS BEAUTIFUL SPOT IS ON THE GREEN, AT KENDALL, MASSACHUSETTS, AND SHOWS THE TREATMENT OF A STREAM WHICH HAS PROVED TO BE A VALUABLE ASSET TO THE COMMUNITY. Photograph shown through courtesy of the F. A. Bartlett Company.

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VOL. XXV

MAY, 1919

NO. 305

WAR'S DESTRUCTION OF BRITISH FORESTS

BY PERCIVAL SHELDON RIDSDALE

EDITOR OF AMERICAN FORESTRY MAGAZINE

This is the third of a series of articles on the effect of the Great War on the forests of Europe, articles based on information secured during a tour of Great Britain, France and Belgium in December, 1918, and January and February, 1919, taken for the purpose of investigating war-time forest losses and of ascertaining how best America can aid in restoring the forests of our Allies.—Editor.

LONDON, February 8, 1919.

THE British navy must have coal. Without coal it is useless. British coal mines must have timber. Without timber they are useless. British forests and woodlands cannot provide all the timber needed for British mines. Therefore Great Britain knew early in the war that unless she could get pit timber, or mine timber as it is called in the United States, from nearby countries she could not keep her mines producing coal and without coal her navy was helpless.

The problem of obtaining pit timber was therefore the most serious forestry problem in Great Britain during the war. She met it by cutting fifty per cent, some 450,000 acres, of her productive timber land for pit timber and other war-time needs and by importation, hampered greatly by the submarine menace, from other countries. Furthermore, she would have cut all the trees in the United Kingdom if it had been possible to transport them to the saw mills. Transportation, due to the fact that every horse and every automobile was requisitioned when war broke out, was not to be had except where saw mills were close to forests and woodlands and this alone resulted in Great Britain having left now about half the forest and woodland

acreage she had when the war started. The need for timber was so great, and the lack of British lumber workers so pronounced that Great Britain speedily realized her deficiencies as a producer of lumber. First she imported Belgian labor. This was not satisfactory. Then she tried Portuguese with better results but she did not

make real progress either in labor or machinery until she secured forestry and lumber battalions from Canada and the saw mill unit organized and equipped in New England and sent over to Scotland for eighteen months' work.

Big saw mills were erected by the Canadians and the saw mill units took over portable mills. These helped wonderfully

to supply some portion of the lumber needs and the remainder was imported. One hundred thousand tons of pit timber a month was demanded by the mines. Ultimately Great Britain was able to supply 40,000 tons of this and import from France 60,000 tons. Previous to accomplishing this some pit timber was secured from Sweden by means of a three-cornered agreement between Great Britain, Sweden and Germany.

The British knew the Swedes needed certain commodities that only they could furnish so they said to Sweden,

SEED FOR GREAT BRITAIN

In order to restore her denuded forest lands and to plant waste land Great Britain needs forest tree seed. Douglas fir and Menzies Spruce is desired and as the seed crop in Great Britain is very small the American Forestry Association has secured a fund which will enable it to present a large quantity of the seed needed for replanting in the British Isles.

AMOUNT OF CUTTING

It is roughly estimated that England, Scotland and Wales, cut about 17,000,000 tons of green timber for war purposes in the three years 1916, 1917 and 1918. This amount is about twenty times the average annual pre-war fellings. This however is only part of loss since the woods had to be slaughtered irrespective of the interests of silviculture in order to keep the collieries and national industries supplied with the necessary timber. This often entailed cutting out suitable sizes for pit-wood and other requirements and ruining the entire future of the woods.

"We will furnish these to you if you send us pit-wood." Sweden replied, "But Germany will not permit our ships to carry pit-wood to England." Said the British, "Tell Germany that you will not supply her with iron ore which she needs, unless she permits you to send us pit timber and you to get in return these supplies you need from us." Sweden made the proposition, Germany adopted it and the three cornered bargain between the two enemies and a neutral was made.

Great Britain was thoroughly in earnest about cutting down every tree if it was needed. Windsor forest, beautiful, historic, thirty miles from London was sacrificed.

for the large developments in munition and other enterprises in Great Britain.

For a few months the authorities in Scotland, where much cutting was being done, endeavored by co-operation with the home timber trade to supplement the supply of sleepers and of trench timber which was required, but this assistance was quite inadequate, and after several conferences in London with the departments interested, it was decided to form the Home Grown Timber Committee which was done in November of 1915.

The Committee was authorized to purchase fabricated timber from the timber trade; purchase woodlands



TIMBER STACKS AT A CANADIAN CAMP

This mill and lumber yard situated in the midst of a good-sized tract of timber land is typical of the way lumber operations were conducted in the British Isles.

A big Canadian saw mill was established in the heart of it and 4,700 of its 7,000 acres were cut. Practically all would have been cut had not the mill burned down when about two-thirds of its work was completed. In and about this forest the writer spent a day as the guest of Mr. M. C. Duchesne, honorary secretary of the Royal English Arboricultural Society and one of the best informed foresters of England.

During 1915 the British Government found that it was becoming increasingly difficult to obtain a sufficient supply of imported timber for the army in France and

from the owners of estates, and carry out independently the exploitation of woodlands on behalf of the Government.

Immediate steps were taken to forward these objects but the Committee was faced with various difficulties—among others, the shortage of labor, and also the provision of plant. The owners of the estates, upon the whole, rose to the position, and with few exceptions willingly afforded the Committee the opportunity of selecting and purchasing their forest ground. The timber trade in Scotland, which was previously fairly well organized,

responded generously, but labor and machinery continued to be a source of anxiety.

For a few months Col. John Southerland acted as executive officer in Scotland and afterwards was asked to transfer to London, and became director of the Committee, with very ample powers. Finding that it was impossible to secure a sufficient number of lumbermen in Great Britain, Lord Selbourne, who was then Minister of Agriculture, approached Lord Kitchener, and as a result the latter cabled to Canada and asked the Dominion Government to provide a battalion of lumbermen. The latter government at once acquiesced, and in the month

end of the year, and added materially to the output.

During the year, the Committee urged the employment of German prisoners of war, and gradually obtained limited supplies of these men for operations. Early in 1917 the Government had to reckon with a further decrease in the shipping available for timber and for other purposes, and as timber occupied a very large share of the tonnage it was decided that operations should be commenced in France, so that as little timber might be carried by sea as possible. In considering this matter it was necessary to remember that Great Britain was dependent upon France for the provision of pit-wood for



CANADIAN OPERATION IN SCOTLAND

A large mill at Knockando, Scotland, erected and operated by a Canadian forestry unit, secured timber from a large area by the use of lumber cables. This photograph shows one cable across the river Spey. The carriage is loaded and the method of operating the cable is clearly indicated.

of June, 1916, the 224th Canadian Forestry Battalion arrived in England, fully equipped with saw mills and tools.

In the meantime the Committee was able to make arrangements for the provision of saw mills and of other plant in Great Britain and Belgian and Portuguese labor was utilized in some of the woods. The Committee was still working under extreme pressure, for the imported supplies were still decreasing, and Lord Kitchener agreed to demand another battalion of lumbermen from Canada. This battalion reached England towards the

the Welsh mines. These mines required about 100,000 tons per month of pit-wood, the greater bulk of which came from the district of Les Landes and Gironde by sea. The Government decided that it was essential that this supply should be decreased if possible by the provision of mine timber at home, and by this time the general supply of timber became critical, and the Government decided that as practically all the wood was required for military purposes the War Office should take control, and they accordingly appointed a Controller of Timber under that department. The Controller of Tim-

ber was authorized to take charge of all operations at home, and to take possession of all the imported timber in the country. He was responsible for the distribution of all supplies, and was given the right to fix prices.

By this process the Home Grown Timber Committee was absorbed into the Timber Control. At that time the Timber Committee had altogether in operation 135 different exploitations in Great Britain, as also 25 exploitations by the two Canadian Forestry Battalions. The development during this period of the supply of pit-wood was such that the imports from France were reduced by 20,000 tons per month.

The War Office and the Controller of Timber in the meantime applied for further assistance from Canada, but these men were really asked for with a view of their being transferred to France. Up till this time it was not possible to commandeer forests, and as encroachments upon them were becoming somewhat serious, and as time was of consequence, the Government authorized the Controller to take such forests as he was advised to select, and the owners were paid, failing mutual agreement, the value of them as fixed by an independent commission. At the end of about three months the Control of Timber was transferred from the War Office to the Board of Trade, and various alterations and improvements were arranged in the administration.

Meantime German prisoners and further Canadian lumbermen were enlisted in the work, and at the date of the armistice England had purchased about 175,000 acres and Scotland about 125,000 acres of timber land.

In addition to the above there was a considerable area of wood cut in the first year of the war, of which no accurate record can be obtained, and altogether probably about 400,000 or 450,000 acres have been felled in consequence of the war.

As to production during the period, the departments concerned apparently have produced about 18 million cubic feet of timber, and the Board about 280 million cubic feet.

A statement of the labor employed at the date of the armistice by the Timber Supply Department in England, Wales and Scotland, is as follows: British subjects, men, 7,717; women, 1,734; Canadians, 6,686; German prisoners of war, 3,486; Portuguese, 1,926; Newfoundlanders, 541; Finns, 618; Danes, 391; other nationalities, 25; making a total of 23,124.

A. P. Long, Divisional Forest Officer for



A STAND OF LARCH

This larch at Birnam Hill, Dunkeld, Scotland, is at an elevation of 350 feet. Much of the felling was of stands similar to this.

the three South Eastern Counties of England, says of the production for war purposes: "We were subject at all times to particularly heavy demands as the conditions at the front called for, and as an instance I may mention that early in 1918 owing to an exceptional call there were despatched from this Division no fewer than

68 trucks of sawn timber per day to France alone for a period of six weeks or more, other Divisions also sending their share.

"The figures for pit-wood, barbed wire pickets defence poles and telegraph poles and other round timber are not available on account of the difficulty in collating the different classes of material and the different systems of returns throughout the country. But it may be said that the production also was increased enormously so that, in spite of the severe restriction of imports, the country generally, including the timber merchants, kept abreast of the requirements.

"Some idea of the extent of this section of the work may be gained from the fact that in one week the South Wales Division railed no less than 8,000 tons of pit-wood direct from the woods.

"I should say that in round timber our principal demand was for pickets and defence poles owing to the fact that the South East of England was one huge armed camp and their requirements were enormous as

well as those for France. In the output of this class of material this Division also supplied its fair share, as you may gather from the fact that last spring we were called upon to supply 569,000 pickets in two months and this was about one-half of one huge order."

WHAT THE WAR HAS TAUGHT

The Earl of Selborne, an authority on forestry, made this very frank statement, "There is no country in which forestry has been more neglected than it has in the British Isles. Now the experience of the war has brought home at last, even to the Government of this country, the immense importance of forestry. We were dependent before the war upon imported timber to an

enormous proportion of our annual requirement, not only for all building purposes, but for all pit-props in our mines, and, as every owner of woodlands knows, we who own woodland found it very difficult to sell our product, however good in quality, for any reasonable price before the war. Now, suddenly in the war, the Government discovered that it is a very dangerous thing to be dependent upon oversea supplies. The shipping problem early became acute, and it was soon seen that a very large proportion of our tonnage was engaged in bringing timber to this country — timber for building, timber for mines, and timber for pa-



A TYPICAL STAND OF SCOTCH PINE

This timber situated near Orton in Morayshire, Scotland, indicates the size and the character of the stands felled by imported lumbermen operating in Scotland.

per making. Very early they had to begin to curtail the supply of tonnage used for this purpose; they began to look about and see what there was in the British Isles that could be used. They found a great deal more than anybody believed existed here, and almost all of it has been found to be of high quality, to be wholly suit-

able for construction purposes and for pit-props, and you will remember before the war the timber trade was constantly telling us that our products were not equal to foreign goods for those purposes. It was not true, we didn't believe it to be true at the time, and the experience of the war has shown that it is not true; and although, of course, a great deal of the timber that has been cut has been used green and unseasoned, owing to the haste with which its utilization has been required, yet it has been proved to be of fine quality. It is no exaggeration to say that if it had not been for what landowners of this country have done in the way of planting in past years, not only without any encouragement from the Government, but in the face of great discouragement of every kind, this country could not have carried on the war.

"Now, what is the position after the war? Practically we may say that the supply of coniferous timber is exhausted. Everything that could be possibly utilized in the way of coniferous timber will be utilized, before the period of a normal supply of shipping for imports after the war has been restored. There will be no coniferous timber in this country, except very young plantations, and comparatively few of them. There will have been

great inroads made upon our ash, the supply of oak will not have been very materially impaired, but such trees as poplars and certain classes of elm will have been largely cut into, and the *problem of reafforestation will at once become acute.*

"If we were caught—which God forbid—in any war of this magnitude thirty years hence, and there had been no replanting on a sufficient scale, the country would be in a very bad position from the very beginning. So far as we can foresee, it would be impossible to keep our mines going on imported pit-props. Therefore, as a mere measure of national safety, apart altogether from the

importance of the forestry industry in any civilized country, it has certainly become necessary for the Government itself to become the owners of forests, and the planter of forests, and to establish a Forest Authority which would own millions of acres, and, gradually, under a proper and well-thought-out system of rotation, establish forests on the French or German model."

HISTORY OF BRITISH FORESTS

In order to obtain a clear idea of the condition of forestry in the United Kingdom at the outbreak of the war it is necessary to know something of its history during the last century, for it was chiefly within that period that the woods felled during the war were planted and tended. From the middle ages onwards the State attempted to

promote the cultivation of timber by legislative methods, but contrary to the custom on the continent of Europe, a very small proportion (less than 3 per cent) of the area of woods in Great Britain remained under State control. The pre-war condition of British woods was therefore the result of the action of economic and social forces on which the State has had little direct influence. It had been profoundly affected by the fact that



British Official Photograph

BRITISH OPERATION IN A FRENCH FOREST

Some sixty thousand tons of pit-wood were cut by the British in the French forests and were shipped to England for use in the mines. The photograph shows a member of a South African labor unit.

unlimited supplies of cheap imported timber were available during the greater part of the 19th century, while the steady rise in prices which marked its close had, when war broke out, only begun to affect the management of British woods.

Both English and Irish private woods of the early 19th century consisted mainly of hardwoods, remnants of the once extensive indigenous forests. In Scotland only were parts of the indigenous forests coniferous, but by the beginning of the last century they had been reduced to an inconsiderable area. Private woods supplied the greater part of the material required for rural and gen-

eral purposes, and owing to the demand for small wood and for oak bark for tanning purposes coppice woods were highly remunerative. It would appear that a considerable revival of interest in forestry, probably more from an aesthetic than a practical standpoint, took place towards the end of the 18th century and continued until the middle of the 19th century.

Towards the end of the 18th century the growing shortage of Navy timber led for a time to an active planting programme by the Crown. It was then determined to plant with oak an area of about 100,000 acres, sufficient to meet the estimated requirements of the Navy. The work was entrusted to the Commissioners of Woods and Forests, who were to find land for the purpose chiefly in



COL. JOHN SUTHERLAND, R. F. C.
British member of the Comité Interallié des Bois de Guerre, stationed at Paris to represent the British Forestry Corps.

the ancient Royal Forests. In 1823 the Commissioners were able to report that nearly 52,000 acres were under timber, but although some planting and replanting went on steadily, the total area had not increased by 1848. A revival of planting took place in the New Forest for a few years after the Deer Removal Act of 1851, but thereafter, as interest in wooden ships declined, interest in the Crown woods declined also, and when forestry again began to receive public attention, about 1880, the importance of Navy timber had disappeared completely. In its place, questions bearing on the more profitable management of the Crown woods, the utilization of waste land and the production of coniferous timber became prominent. The operations of the earlier



British Official Photograph

BRITISH FORESTRY CAMP IN FRANCE

This camp and mill combined is typical of British forestry operations on the western front in France while the character of the French forests leased and cut by the troops is indicated by the forest on the ridge.

part of last century have borne good fruits, for although the Crown woods were formerly managed chiefly with a view to producing hardwoods, and the more recent coniferous plantations are not old enough to yield merchantable timber, there have been set aside, in the New Forest and Windsor woods alone, since the outbreak of war, and are felled or in process of felling some three and a half million cubic feet of large coniferous timber and approximately one hundred thousand tons of pit-wood.

FUTURE FOREST ACTIVITY

Great as has been the sacrifice of forests and woodlands by Great Britain it has not been in vain for knowledge of her weakness in timber resources forced upon her by the war has led to a movement that assures more forest activity in the future than she has ever exper-

United Kingdom having regard to the experience gained during the war.

In view of the fact that a national lumber and forest policy for the United States is now being earnestly advocated it is well worth noting that this British forestry reconstruction committee in its report to Parliament states that the British forest policy has been totally inadequate; that dependence on imported timber is a grave source of weakness in war; that the supplies of timber even in times of peace, are precarious and lie too much outside the Empire. These conclusions, the committee states, are not only the best reasons for extensive planting but afforestation would increase the productiveness and population of large areas of the British Isles which are now little better than waste.

The committee presents a summary of its main con-



British Official Photograph

CHARCOAL FOR THE BRITISH TRENCHES

The charcoal made in the French forests leased by the British were packed in bags by Indian labor troops and sent to the front on the narrow gauge railways so generally used by the armies for transportation.

ience in the past. Plans have already been made and are rapidly nearing completion, for the reforestation of her cut over areas and for the planting of great areas of waste land suitable for nothing except the growing of timber. A committee of distinguished men, after a careful survey of the situation, has submitted to Parliament a report and recommendations which undoubtedly will be the basis of the future forestry program in the British Isles. This committee was commissioned to consider and report upon the best means of conserving and developing the woodland and forestry resources of the

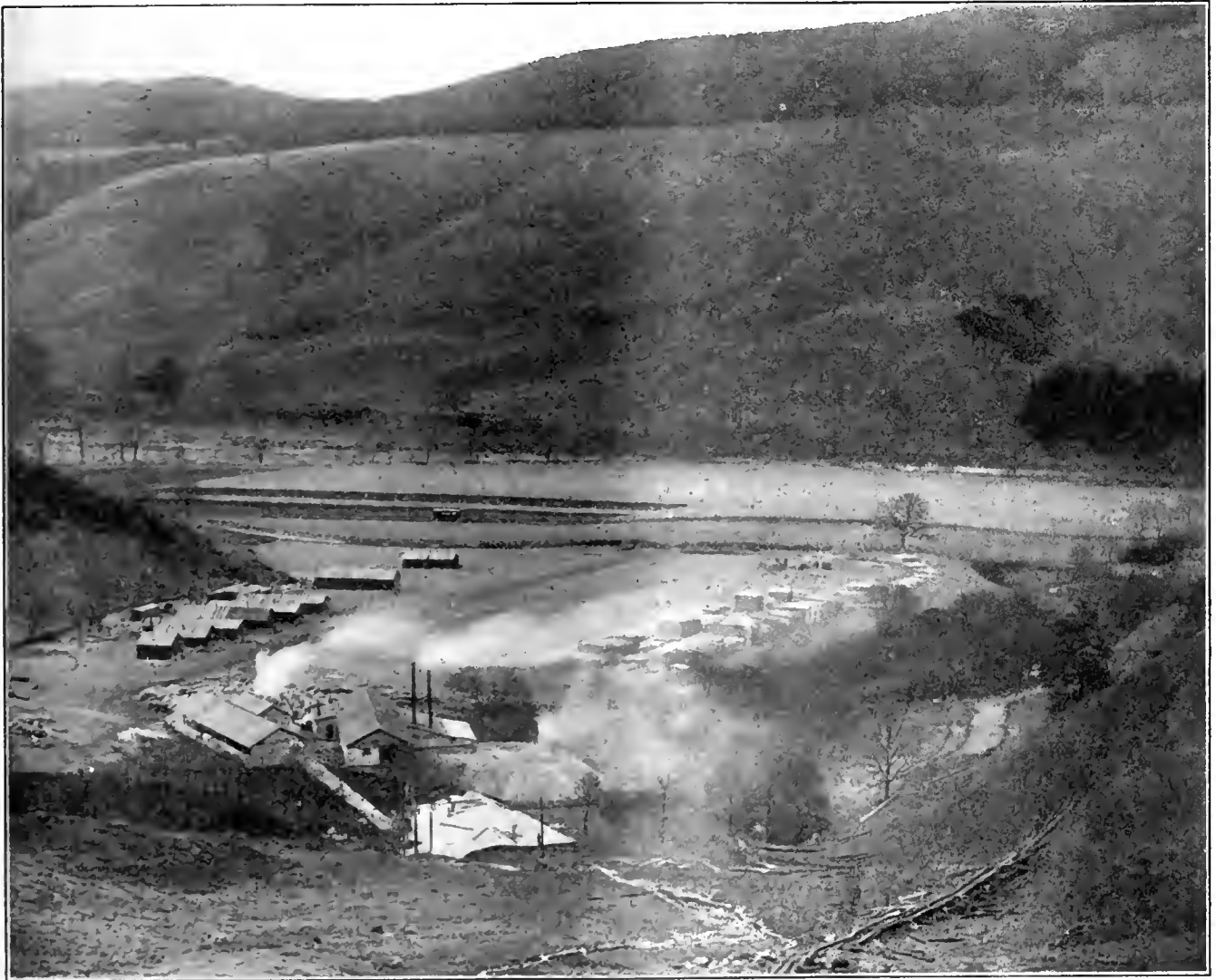
clusions upon the forestry situation in Great Britain by saying:

(1) The total area under woodland in the United Kingdom before the war was estimated at three million acres, the annual yield from which is believed to have been forty-five million cubic feet, or about one-third of what it should have been under correct silvicultural management. These figures indicate the unsatisfactory condition of British and Irish woods as at present managed, and prove the urgency of remedial measures in the interests of national economy.

(2) During the five years preceding the war the average annual imports of timber similar in character to that produced in the British Isles were equivalent to five hundred and fifty million cubic feet of standing timber. The home production was therefore less than eight per cent of the consumption. The imports of timbers of all kinds during the years 1915 and 1916 were respectively three-quarters and two-thirds of the normal pre-war imports, and their cost for the two years was seventy-four million

(4) Dependence on imported timber has proved a serious handicap in the conduct of the war. The United Kingdom cannot run the risk of future wars without safe-guarding its supplies of timber as every other Power that counts has already done.

(5) In order to render the United Kingdom independent of imported timber for three years in an emergency, it is necessary, while making due allowance for an improved yield from existing woods, to afforest 1,770,000



A MILL OPERATED BY NEWFOUNDLANDERS

This mill and encampment at Craigoinean, Dunkeld, Scotland was a good sized operation, the extent of which is plainly shown by the photograph taken from the hill overlooking the mill.

pounds, or thirty-seven millions in excess of their pre-war value. These imports absorbed seven million net tons of shipping, equivalent to approximately fourteen million tons dead weight.

(3) The area of land utilized for rough grazing, but capable of growing first-class coniferous timber of the same character as that imported, is not less than three and probably more than five million acres. Two million acres could be devoted to timber production without decreasing the home production of meat by more than 0.7 per cent, and if so used would ultimately afford employment to at least ten times the number of men now engaged on that area.

acres. Taking 80 years as the average rotation, we advise that two-thirds of the whole should be planted in the first 40 years. We consider that the quota to be planted in the first 10 years should, in view of the initial difficulties, be limited to 200,000 acres, of which we advise 150,000 acres should be planted by the State and 50,000 acres by public bodies and private individuals assisted by grants, or by co-operation between them and the State. The area to be planted by the State in subsequent years may be reduced in the same degree as private individuals come forward to undertake the work.

(6) It is not proposed to plant arable land, but a limited area of arable land should be acquired with the

forest sites wherever possible in order to provide small holdings for forest workers. Our proposals carry with them the important contingent advantage that they will cause large areas of the United Kingdom, now almost waste, to be put to their best economic use. They will also, if provision is made in time, afford the means for settling discharged soldiers on the land under healthy conditions.

(7) Forestry demands long views, but the first fruits are not so long delayed as many imagine. The policy of

The care of forestry, now divided among several departments, should be centralized in this body.

(9) We recommend that the Authority should be authorized to make limited grants for every acre replanted or newly afforested during the first 10 years after the war by public bodies or private individuals; such plantations to be made in accordance with approved plans and conditions.

(10) We estimate the cost for the first 10 years at £3,425,000. It may be necessary to invest £15,000,000



British Official Photograph

CHARCOAL KILNS NEAR THE BRITISH FRONT IN FRANCE

British soldiers attached to the forestry division making charcoal in one of the forests leased from France. This charcoal was used for warming the troops in the trenches.

State afforestation which we recommend will begin to provide pit-wood, from the quicker-growing species on the better kinds of mountain land, from the 15th year onwards; by the 40th year the plantations made in the first ten years alone will contain sufficient timber to keep our pits supplied, in emergency, for two years on the scale of present consumption.

(8) The first essential is a Forest Authority equipped with funds and powers to survey, purchase, lease and plant land and generally to administer the areas acquired, with compulsory powers to be exercised, when needed, after due enquiry and the award of fair compensation.

altogether in this enterprise during the first 40 years. After that time the scheme should be self-supporting. The financial return depends on prices, wages, bank rates, etc., which are difficult to forecast. Forests are a national necessity; the country must have them even though they yield less than the current rate of interest on the capital invested. The whole sum involved is less than half the direct loss incurred during the years 1915 and 1916 through dependence on imported timber.

(11) The above proposals are framed in the interest of national safety, which requires that more timber should be grown in the British Isles. There remains a further

question. The United Kingdom derives more than half its imported timber from virgin forests in foreign countries, which are steadily being depleted. Canada contains the only large reserves within the Empire. Unless arrangements can be made with the Dominion Government for the effectual conservation of these reserves, it is inevitable that provision should be made within the British Isles on a far larger scale than is here proposed for the purposes of defence. We consider that this

British Isles, but also to set in motion the machinery for carrying it into effect.

"Thirdly, to constitute a body who can view the forestry situation in Great Britain as a whole, and decide on purely forestal grounds the conflicting claims of the various countries unbiased by local or political pressure.

"Fourthly, to constitute a body who, in time of war, could act with the Military Authorities to exploit both State and private forests for the benefit of the country.



British Official Photograph

BRITISH FORESTRY SOLDIERS CUTTING WOOD IN FRANCE

The British Army needed quantities of lumber for barracks, trenches, dugouts and other military uses and several companies of lumbermen were kept busy supplying these needs by cuttings in forests leased from the French.

question should be taken up at once with the Dominion Government."

NEED OF A SINGLE AUTHORITY

General Lord Lovat, in command of the British Forestry Regiments and a member of the Forestry Reconstruction Committee, in speaking of the future development of forestry in the British Isles emphasizes the importance of a single forestry authority having complete charge of the work which it is planned to do.

Lord Lovat very frankly says the creation of a single forest authority is required:

"Firstly, and principally, to make a definite break with the past, to get out of the welter of conflicting authorities and to escape from the arena of party politics, Royal Commissions and amateur inquires.

"Secondly, to make it possible for an accredited authority not only to draw up a definite forestry policy for the

He adds, "the first three points have been dealt with in the report of the Committee. It is only necessary to say about the fourth point that in France at the beginning of the war a central Forestry Authority existed, the resources of each forest were known; the transport facilities, railway sidings and light railways had all been studied in times of peace, with the result that the maximum of production was possible with the minimum of effort.

"Forest utilization in England at the beginning of the war presented a very different picture. It was twelve months before the Government improvised machinery to deal with the subject. By this time many of the skilled men had already enlisted. Mills were to be found without men, men were to be found without mills. Forest workers were badged and de-badged at uncertain intervals. Departments competed for labor, while German

prisoners, skilled in forest work, were unemployed for months, and, after their employment, tied down with such regulations as to make their work relatively unproductive.

"Even the responsibility for the organization on timber production was never vested in one authority for many

"It is difficult to see why Great Britain, who has her State forests and forest policy still to create, should be an exception to this generally recognized rule. It is certainly not on the experiences of the past that she can base any claim to be an exception from the methods that have been found to be necessary elsewhere."

WOMEN WORKERS IN FORESTS

The lack of labor made it necessary to employ a number of women in forestry work. The women so placed were drafted from the working classes, and they had not undergone any course of training preparatory to their taking up employment in forestry. Many of them were



A REAL HUSKY CHOPPER

After instruction and practice women were able to fell timber quickly and cleverly. This young woman was a particularly capable wielder of the ax.

consecutive months, but changed from the Board of Agriculture to the Office of Works, from the Office of Works to the War Office, and from the War Office to the Board of Trade. The fault for all this is to be found in lack of organization before the war. Nothing had been thought out, no authoritative body existed in whom the public had confidence. It was impossible to execute a survey of timber resources and build up an organization once the war had begun.

"It is not, however, with the past but with the future that the nation is concerned. How to make a forest policy, how to carry it out, and, if the occasion arises, use the resources that the State has built up for the State's best advantage.

"Both in precept and practice the countries of Europe, the teachings of all recognized authorities and the findings of the principal arboricultural societies, not only in Great Britain but elsewhere, have agreed that a forest authority is a necessary part of State afforestation.



COSTUMES OF WOMEN WORKERS

This sensible costume of shirt, trousers, puttees and heavy shoes was found most suitable for the women workers in the woods.

unemployed women, who were idle because of slackness in certain industries, fishing, spinning, mills, etc.

Mr. G. P. Gordon, in reporting on the results of this action, says: "Experience of working squads of these women proved that this type of worker without training is not altogether suited for rural work on the land. Although in many cases good individuals and good squads were encountered, the average individual was too unsettled to obtain the maximum value from her work. It is thought that women of this class, for true economy, must be constantly in touch with their own homes, as they were found to be less adaptable than more intelligent

and better educated women. Further, it was found that the supervision of this class of worker was somewhat costly, as initiative so necessary in land work was almost entirely lacking.

"A problem which had a considerable influence on the efficiency of these workers was the question of dress. It was found that ordinary foot wear was quite unsuitable, and experiments were made with clogs, high boots, leggings, etc., and finally it was decided that stout boots and leggings were the most useful. The ordinary apparel

for them, they were not able to purchase food in a thrifty manner, and therefore had to suffer many discomforts. Probably as a result of this the women were difficult to control, and were somewhat unreliable as regards time-keeping.

"A certain allowance must of course be made, due to



STRENGTH REQUIRED FOR THIS LABOR

It was found that women could stand harder work than was anticipated and it is apparent the labor was far from light.

of the women was found to be unsuited for wet weather, and experiments were made with waterproof skirts, which were not, however, found to be very successful. In nursery work skirts are always a drawback, as they damage young plants in the nursery lines, and also break down the edges of seed beds. In addition, in wet undergrowth they are a decided hindrance to freedom of action. For outdoor land work it is essential that women have the equivalent of a man's jacket, which can be donned during a shower and cast off in hot weather or for strenuous work.

"The question of housing this type of woman away from her home was one which was attended with many and varied difficulties. In the first instance comparatively few of the women were able to do for themselves properly. Further, although they had their food prepared



MEASURING THE FELLED TREE

The women workers were able not only to fell a tree but also to report on the amount of lumber to be secured from it.

the fact that the work and the conditions of labor were entirely new to the women, most of whom were unacquainted with outdoor work and rural conditions generally.

"The experience gained during the years 1915 and 1916 forced one to the conclusion that this class of untrained labor was not the most efficient for the purpose in view. An attempt was therefore made to partially train the women to at least a knowledge of out-door conditions. In this connection the West of Scotland College of Agriculture organized at Kilmarnock in 1917, a scheme for this purpose. The women went into residence at the College farm for a few weeks, and were thereafter drafted to forestry work on different estates throughout Scotland. There was no attempt made to train the women technically in forestry work, but they obtained an opportunity of experiencing land conditions. It was found that the type of women willing to undergo this period of probation was a more intelligent one than those form-



SHE FACED THE CAMERA

Nevertheless she was no fanciful worker but able to do her share of a day's labor in a highly efficient manner.

erly dealt with. In addition she was more adaptable, more reliable, and gave better satisfaction to her employer. These women were drafted to various kinds of forestry work, *e. g.*, seed collection, forest nursery work, planting work, draining, bark peeling, timber felling, brushwood burning, and bracken cutting.

"Although the period of instruction is too short almost to warrant the term training being used, reports from the employers of these women show that the scheme has been more than justified. Their work has included draining, planting, fencing, nursery work of all kinds, felling timber, 'snedding' and cross-cutting timber, measuring timber, and saw mill work. Further, they have engaged in general estate work, bark-peeling, bracken cutting, clearing up and burning brushwood. During hay time and harvest they have been drafted to this work, which has the advantage of giving that variety which experience shows is so necessary in women's work on the land.

"The effect on the women of this kind of work, has been noticed, and in no case has it been found to be detrimental. They have all been able for the work undertaken, and have quickly become fairly expert at it. Their health has, in all cases, materially improved with the out-door occupation, and this has been so even in cases where they have been employed all winter."

STRATEGIC IMPORTANCE OF FORESTS IN THE WAR

BY J. DEMORLAINE

Translated by Samuel T. Dana, U. S. Forest Service, from *Revue des Eaux et Forêts*, Paris, France, February, 1919, and revised to date by Percival S. Ridsdale, Editor of AMERICAN FORESTRY.

"WOODS are an ornament in peace and a fortification in war," wrote Cicero two thousand years ago. Was he thinking at the time of the barbarian invasions which menaced the Roman world and which the destruction of the forests of Gaul by the legions of Caesar succeeded only momentarily in arresting? Certainly in uttering this aphorism, eternally true and now more than ever justified, the prince of Latin orators could not foresee the war in which we have been engaged for more than four years, and in which the woods and forests of France have perhaps played as vital a role as our cannon. It is to wood—wood in all its forms, utilized behind, within, and in front of our trenches—that we owed our ability, in spite of inferior numbers, to hold in check the barbarian hordes invading our native soil.

No one could have anticipated that modern war—prepared for, in fact, as a war wholly of movement—would have become for long months a war of position, transforming our front, from the North to the East, into a vast entrenched camp, and demanding wood in the most diverse forms, from entanglement stakes or telephone

pole cross-arms, to timbers buried several feet below ground,—from the smallest coppice pole to the most majestic veteran of the forest. Our French forests were fortunately very rich. Thanks to the conservative foresight of our foresters since the organization of the present conscientious and devoted forest administration, they have been able to satisfy all needs in spite of the important and more and more numerous demands of the army.

While this is not the chief role which foresters and military men had believed the forests would play if war, always menacing, should unchain its ravages on our country, can anyone say that they have failed to measure up to all the expectations which the facts of history, classic through repetition since the most remote times, might arouse? By no means; our woods and our forests have not only given us unreservedly of their riches to enable us to hold our own against the invader, but they have also played a no less glorious part in the episodes of this unforgettable war, which will unquestionably remain the most terrible and most monstrous war of modern times.

In the days now far distant when we sat on the benches of the Forestry School at Nancy, our comrades will recall that we were taught that our woods and forests would play a dual role in war. In proportion to their extent they could have, on the one hand, a tactical influence as points of support in particular corners of the field of battle, while on the other hand, when affording a continuance screen, they could play a most important and valuable part as a mask for widespread movements and for important maneuvers of large masses of troops.

It is considerations of this sort that for four years we have expounded to our pupils at the National Institute of Agronomy. How many of them have been able to verify in person the truth of these theories; how many have unhappily wet with their blood the soil of a wood

our men who fought to the death under the shade of these unfortunate woods—which are now themselves gone and for so long a time—appreciated too well their tactical value!

Can we minimize the strategic value of our more continuous forests, any more than we can deny that the smaller patches, often only a few hundred acres in extent and without a name until baptized with some title suggested by their shape—"square," "triangular," "star-shaped woods"—have played a truly military role in the defense of our front? Let no one be so deceived. Our great French forests, from the Vosges to the sea, have often stripped the invader of his offensive powers.

In 1914 the German armies of the East are held up on the crest of the Vosges from Mulhouse to the forests of



Photograph by Underwood and Underwood

NORTHERN FRANCE—A BATTLE-SCARRED AREA, AS IT APPEARS TODAY

A scene at sunset on the National Road between Soissons and Chavignis, at one time the very center in the turmoil of battle. These skeletons—mute and pathetic witnesses—are all that remain of the once magnificent avenue of trees which lined the road.

the tactical importance of which they fully understood, and which it had been their mission to defend at any price?

This conception of the military role of forests, based as it is upon the numerous and exact data of history, should not and can not be minimized when we consider this latest war. Is it necessary to recall the names, forever celebrated, of the woods of le Pretre, of la Grurie, and of Mortemart, where thousands of our soldiers were cut to pieces by shells in defending the approach against the repeated attacks of the infamous Boche? Those of

Parroy before Luneville. The great forests of Alsace, of the Vosges, and of Lorraine permitted us to regroup our forces. Epinal was saved. At the same time the defense of the Grand Couronne of Nancy succeeded in supporting itself in the important forests of Champenoux and of the plateau of Haye.

When, after having jumped the defiles of the Islettes and of the Chalade in the Argonne, the victorious hordes tried to menace our lines of communication in the rear while themselves advancing on the Marne, it was again the great forests of Trois-Fontaines, in front of Saint-

Dizier, which saved this important nucleus of roads and railways and enabled us to prevent the Boche from reaching the Marne from above Vitry-le-Francois.

To the west the army of von Kluck, seeking to isolate the bulk of the French army in front of the capital and thinking to enter Paris without striking a blow, appeared to forget the dense defensive screen constituted by the forests of Villers-Cotterets and of Compiègne. Thanks to this the army of Manoury accomplished its rapid movement and fell upon the left flank of the German army. Paris, one can say without exaggeration, was saved the first time by its forests.

It is thanks to these again in July, 1918, that Marshal Foch, supporting himself on the projections of the forest of Villers-Cotterets and of Compiègne worked out the offensive that later developed into the brilliant victory that we admire today, and that gave our arms the decision in this unforgettable campaign. The great forests of Retz (Villers-Cotterets) and Guise (Compiègne)—advanced bastions in the defense of the entrenched camp of Paris

If we look at things from the point of view of the enemy, we see that the important forests of Saint-Gobain permitted him to retard the victorious advance of our troops and to defend the important stronghold of Laon, which made a deeper and deeper pocket in our steadily advancing line. In front of Mangin's army the German retreat was favored by the wooded nature of the country which is covered by a dense screen of forest. The movement of transportable material and of enemy units was well protected by the shade of our forests, behind which the Boche found a protective shelter. And if one stops to look at the map, without which one may easily go astray, he will find between the Sambre and the Moselle the immense screen of forests which succeeded in 1914 in masking the concentration of the 3rd, 4th, and 5th German armies.

According to General Malletterre: "North of the Oise, the Serre, and the Aisne, the forests of Mormal, Nouvion, Richeval, Signy Mazarin, Saint-Pierre Mont, and Dieulet; the woods of the northern Argonne to the north of



A WOODED SECTION OF THE BRITISH FRONT IN FLANDERS

Here is a photograph which shows the effect of sustained shell fire on a section of wooded country. It shows British troops advancing over newly captured ground from which the Huns have been driven by artillery fire.

permitted the Generalissimo and his lieutenants to mass fresh divisions and important groups of artillery out of sight of the enemy's aviators. The latter sought to jump the gap at Soissons between Compiègne and Villers-Cotterets. From the forests of Compiègne, of Pierrefonds, and of Villers-Cotterets our counter attacks issued in force, consciously supported by artillery well secreted from all indiscreet reconnaissance. Paris was saved again! The capital may well be grateful to the forests that surround it.

Grandpre, then to the east of the Meuse the forest of Woevre, the woods of Damvillers and the forest of Moyeuivre, surrounding Briey, form an almost continuous cover on the accentuated hills. The great wooded region of the Ardennes shows itself in the north, between the Sambre and the Meuse, as an extended mass of sombre woods—the forests of Trelon and Saint Michel. East of the Meuse the forests spreads out indefinitely over the vast plateau of the Ardennes up to Moselle. Mons, Maubeuge, Mezieres, Sedan, Montmedy, Longwy,

and Briey mark the vast and undulating line of forest in Belgium and France."

It is in this great zone, and under the protection of the immense forests of our northern frontier, that Ludendorff tried to direct the retreat of his armies when once forced to abandon the forest of Saint Gobain, the central bulwark of the Hindenburg line. As was foreseen, the forests of the Ardennes offered to Ludendorff a favorable ground for the establishment of a new center of re-

time, the forests have played a glorious and momentous part in the campaign.

This should not be forgotten when we now think of repairing the immense disasters and the bleeding wounds suffered by these majestic forests. As evidence of our gratitude for the part the forests have played, let us leave to nature, intelligently aided by the work of foresters, the task of patiently reconstructing them. Nature is a good mother; she knows how to do things quickly



FOREST DESTRUCTION ALONG THE FIGHTING LINE

This before the war was a well wooded ridge, the famous Messines Ridge from which the British drove the Boche by terrific shell fire. The photograph shows what is left of the trees after the several tornadoes of shell, machine gun and rifle fire which swept over the ridge.

sistance around which the German right wing could pivot. The resumption of our offensive in the north surprised him. Von Hutier received the order to vacate the pocket of the Laon and to abandon the precious support of the forest of St. Gobain. He concentrated all his forces on the plateau which follows the canal from the Oise to the Sambre, supporting himself in the rear on the forests of Mormal and the Nouvion,—that immense green block which the map shows us to the north of the Cateau. The forest of Mormal, more than 9 miles long and about 6 miles deep, constituted for the enemy a point of solid support and a formidable obstacle to the advance of the Allied armies. It was necessary to make the Boche evacuate this dangerous obstacle by well planned turning movements. The British thought that this would be too long a piece of work, and audaciously resolved to force the issue. The army of Rawlinson turned at the same time the powerful defense formed by the forest of Andigny, which the troops of the army of Debeney occupied. On November 4 the great green block on which the Boche had counted to retard our offensive fell into our hands. Far from disproving the strategic importance of the forests, these facts confirm it. Only the heroism of our poilus kept it from being of great and prolonged value to the enemy.

What more powerful demonstration could be wished of the strategic importance of forests in war? Appreciated in time of peace by the tourist and the hunter, who find in their charming walks an easy and agreeable pas-

and well. Let us assist, not hinder her, in her work.

It is not necessary to ask these forests—already bled white, to furnish wood of every nature for our front lines, torn by shot, often devastated thoughtlessly by troops—to furnish in increased quantity the necessary materials for the reconstruction of our liberated regions. The Boche must pay back in kind the wood which he has forced us to spend without stint in opposing the fury of the invader. Our French forests, and particularly our beautiful forests of Ile-de-France, ought to enjoy a long and well merited rest from the devastating ax and, above all, let us not give aid to their enemies by allowing the hunting of game, which the war has stopped. The natural balance in the animal life of the forest has been re-established by the war itself. Let us not favor the return of the rodent under the pretext of restoring hunting, often so harmful to the regeneration of our high forests. These massive stands, after the long and hard campaign, need a long and well earned rest! They have had their long months of suffering; let us leave them to refresh themselves in perfect peace. By their strategic importance, which our great military chiefs have not forgotten, they have saved France. In return let us permit them to recover themselves. Failure to aid them in healing their numerous and glorious wounds would be not only a crime of treason against the country, it would show how poorly we understand the real interests of the nation.

"In the depth of the wood the country has its heart." This should never be forgotten.

Spring In Maryland



*The valleys call to the mountain tops and the
mountains to the plain,
The east wind whispers to the Bay and Kent
hears the refrain.
The whip-poor-will lends a mystic thrill to the
chanting of the marsh,
And the lonely loon stills the insects' croon with
a summons loud and harsh.*

*The tang of the Severn calls to the rose and the
Bluebird hears the cry;
In Talbot's lanes the cardinal sings, and is an-
swered from the sky.
A magic dew wakes the lilac, too; the daffodil
answers the thrush;
The burnished moon sets the swamps in tune, till
the willows bid them hush.*

*And the shattered dreams of the winter are
soothed in the cedar's balm;
The blue sky beams on a fairy land, and reflects
the Chesapeake's calm.
The sky and flowers of Nature's bowers, the hills
and the eastern strand,
The birds, the sun, and Man as one, greet the
spring in Maryland.*

—By John Ferguson.

MONUMENTS WITH A MEANING

THE American doughboy had an important share in making over the map of Europe. Now, but in a different way, he is making over his own country. This is coming about through the memorial plans which are being worked out in hundreds of places throughout the United States.

The memorials of this war are not going to be the "meaningless mausoleums and monuments" which the late Colonel Roosevelt one time condemned: but they will in most instances typify the service and the sacrifice which the nation's fighters endured in order that others might

their soldier and sailor dead, or to those who offered their services. It is combined in park and city beautification systems, in the laying out of Victory driveways and in the setting for other forms of memorial. All this is in line with the suggestion of the American Forestry Association that trees be planted as tributes to the sacrifices of the country's heroes.

Arbor Day took on a meaning in many states this year which it has not possessed since its first observance in the United States more than forty years ago. It was made the occasion in many places for dedication of the



THE "FATHER OF FORESTRY" IN PENNSYLVANIA—DR. J. T. ROTHROCK, OF WEST CHESTER

Known, loved and honored as a pioneer in forestry, not only in his own state but all over the country. Dr. Rothrock, who is a vice-president of the American Forestry Association, recently celebrated his eightieth birthday, and on Arbor Day the State planted eighty trees in his honor.

enjoy greater happiness and peace. The men who gave their lives for their country would ask no better, no nobler, no more lasting memorial than that they live in the hearts of their countrymen. This is being accomplished through the parks, community centers, memorial drives and roadways and similar city, town and county betterment plans that are being worked out.

Tree planting is a feature of most of the memorials which communities all over the country are erecting to

trees planted to men who had paid the supreme sacrifice, as well as to some of the leading figures in the war, including President Wilson, General Foch, General Pershing, and others whom the community took this fitting opportunity to honor. In Pennsylvania, for instance, it was selected for the setting out in one of the state forests of eighty trees in honor of Dr. J. T. Rothrock, the "father of forestry" in that state and a vice-president of the American Forestry Association. Arbor Day was very

generally observed throughout Ohio, the school children being particularly active in planting trees in school grounds to former students who had gone into the service. In Cincinnati among the schools which planted trees on that day were Whitter, Bond, Hill, Westwood, Oakley, Vine, Washington, Carson, Opportunity Farm school. At Millville, New Jersey, each of eight schools planted a tree in one of the city plazas. Simple and impressive dedi-

catory services were held as a rule with the plantings. One of the most touching of these was that at Burlington, New Jersey, where the baby hand of little Eleanor MacFarland tenderly clutched the branches of the tree which was planted in honor of her father, Dr. James MacFarland. When Mrs. Frank L. Johnson, president of the Civic League, at the conclusion of an address in which she spoke of the beauty and the value of trees and of their fitness as memorials, came to the naming of the tree in honor of Dr. MacFarland, who died on the battlefield in France, his little daughter was lifted up and her hand

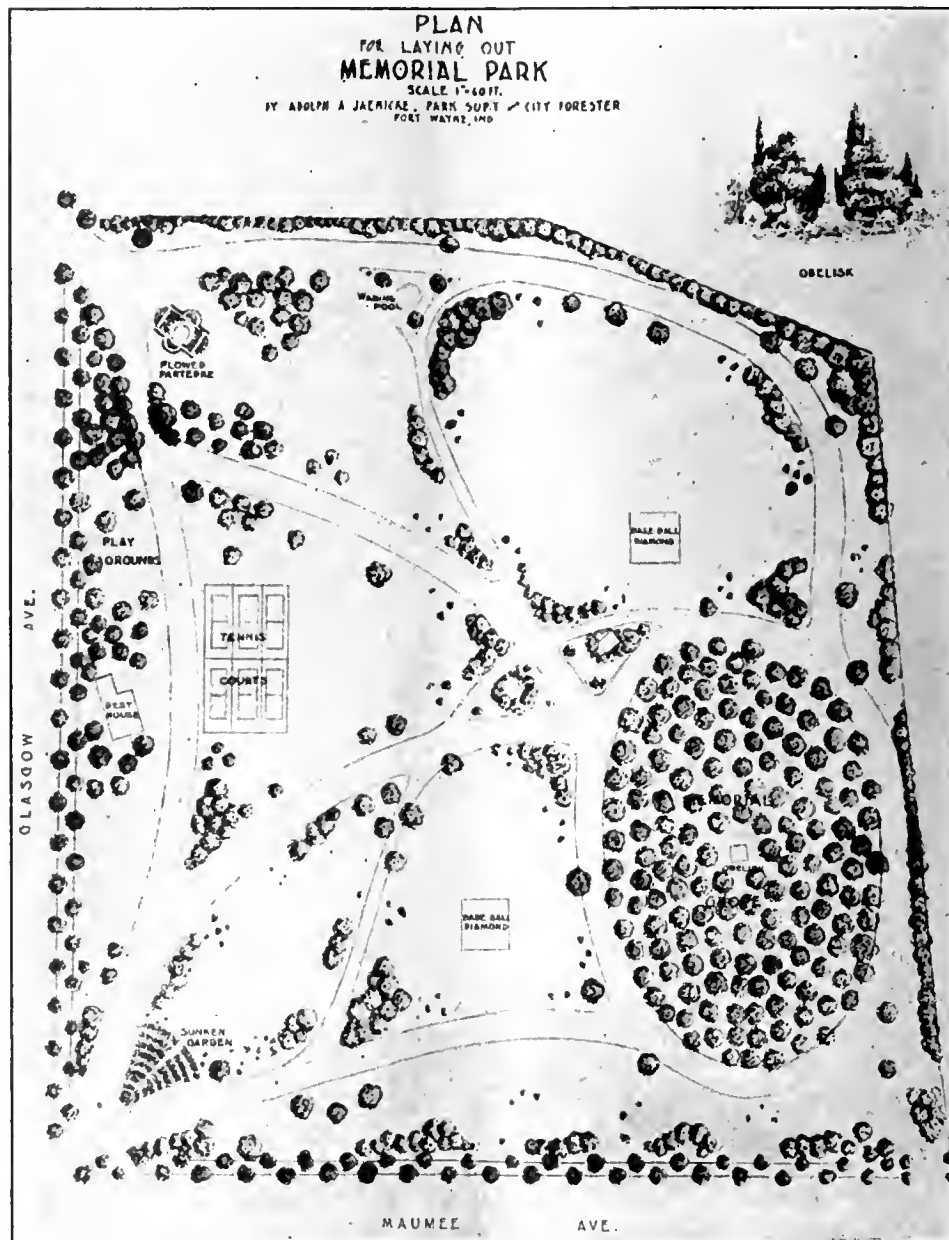
placed on a branch beside that of Mrs. Johnson. All the schools in the city took part in the ceremony, which included the reading of a letter showing how the dead hero had won the Distinguished Service Cross for helping comrades under fire. As these men fought for a better America, so are they honored most in memorials

which represent service, which stand for civic improvement and betterment and for the happiness, development and uplift of all classes. A fine example of the new community spirit which is being built up, of the finer Americanism which is being developed was displayed by the town of Reading, Massachusetts, on April 19, observed throughout the state as Patriots' Day, when everybody in the place turned out to help convert an eleven acre tract

which had been donated to the city into a soldier's memorial park. Prosperous bankers and shopmen, men, women and children, worked together side by side with shovel and hoe, to make a place where the community might enjoy itself. Thirteen elms were planted in honor of the men from that town who had given their lives in the war, while several thousand other trees and shrubs were set out.

In this connection a most interesting group plan is being worked out by the Sharon County Church Community Center, Farmington, Iowa. There a two-day program with exercises devoted to the development of

the park and playground have just been held and the special tree-planting day was designated as Roosevelt Day, because as Rev. Edward Roberts, pastor of the church, said in his communication to the American Forestry Association, "the present country life movement began with the report of the Commission on Country Life



PLAN FOR MEMORIAL PARK

This is the way in which Fort Wayne, Indiana, has prepared to honor her soldiers. The large memorial grove in one corner of the park contains four and a half acres of oaks, each tree a memorial to a fallen soldier. Playgrounds, tennis courts, baseball diamonds and other means for community improvement are provided.

appointed by Mr. Roosevelt; and this constitutes added reason for the participation of country churches in this memorial feature." Plans for the tree planting at Sharon working harmoniously with other community development schemes, were prepared by the landscape extension department of the Iowa State College. Such plans as those being put into operation at Sharon are powerful factors in encouraging the forward to the land movement. At Sharon there are directors of domestic science, recreation, children's play, athletics, gardening and all other social activities tending to better living conditions.

Anything that tends to city beautification makes for general social betterment. The work being done in set-

both for patriotic and civic reasons. It will turn a place hitherto unattractive into a beautiful spot, thereby benefiting the city as well as honoring it."

In Philadelphia the trees to be planted in honor of that city's soldiers and sailors include a group of 500 in Logan Square, surrounded by the Cathedral and other historic buildings. This section of the city is being converted into one of the garden spots along the Parkway which extends all the way from City Hall, in the heart of the business district, out to spacious and beautiful Fairmount Park. Philadelphia is planting trees in many other places. Three oriental planes have been set out in Franklin Square in memory of the men from the fifth local draft board. Seventeen trees of the same variety



Photograph by Dayton News

PAYING TRIBUTE TO OUR NATION'S HEROES

Pupils of the Harrison School, Dayton, Ohio, as part of their Arbor Day celebration, planted fifty-five trees in honor of former members of the school who were in army or navy service. They also honored in a similar way President Wilson, Generals Foch and Pershing, Governor Cox and General William Henry Harrison after whom their school was named.

ting out miles of trees through parks and of planning new parks, therefore, is most commendable. Minneapolis is placing several miles of trees through its extensive park system. From Spokane comes the report of the planting of a mile of maples along one of the finest residential avenues. Mrs. Sam Jones, president of the War Mothers of Atlanta, which organization was responsible for the conversion of Pershing Point into an attractive park, says in speaking of the project: "We feel that we are going to provide something of which Atlanta will be proud,

were planted in Disston Park, Tacony, a suburb, in honor of the men from that community who lost their lives. Between the rows of trees a flower bed in the shape of a keystone has been placed and in the center of this a marble cross is to be erected.

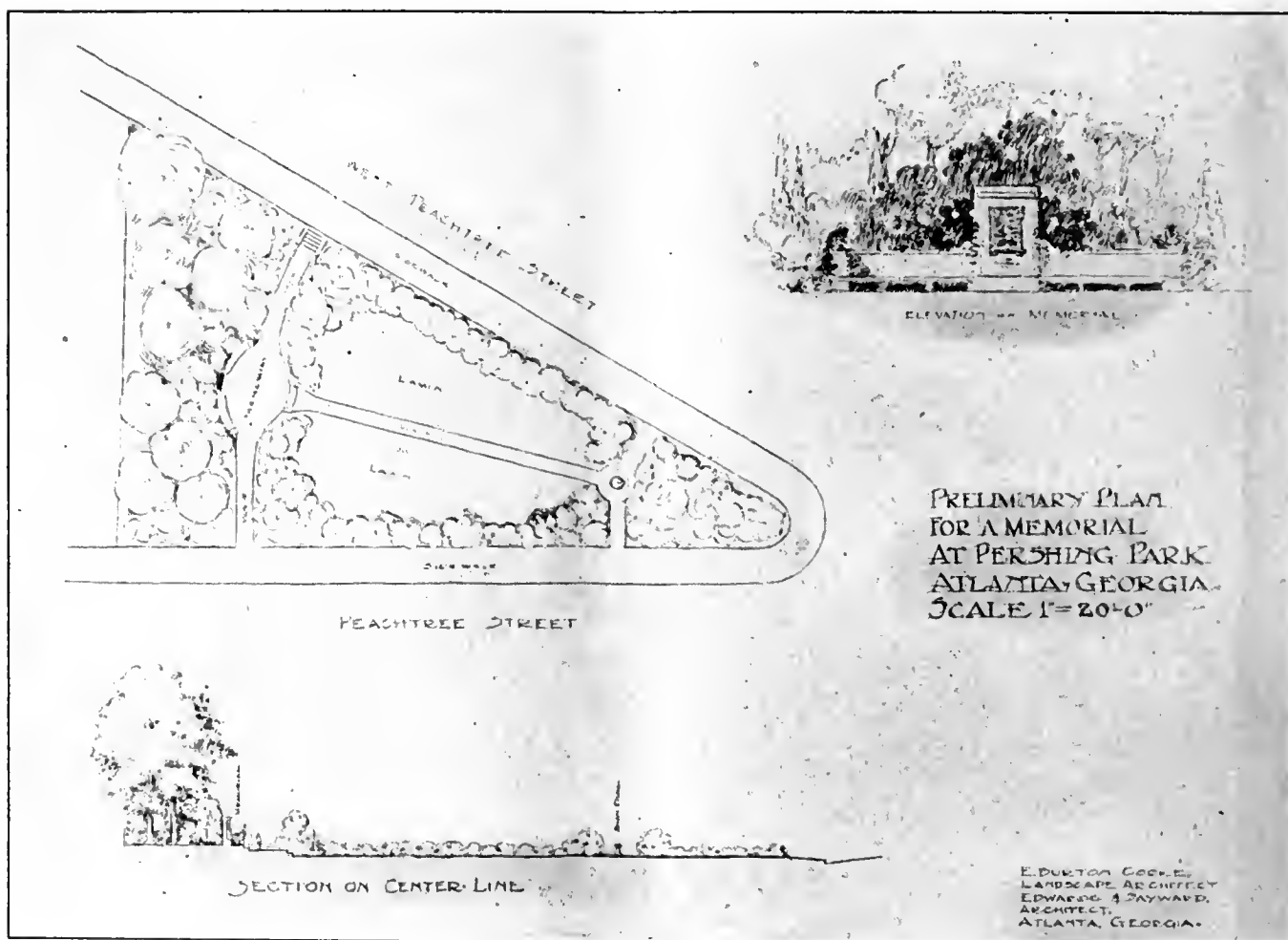
"We cut the trees down ruthlessly, but the time will come when we will wish that we had more trees," declared J. L. Dumas, in addressing the Western Washington Horticultural Association at Everett, Washington, recently. He then went on to say that he knew of no

better movement than that of planting memorial trees to soldiers and sailors; and he added:

"I think that we should join in the great movement for planting trees along the roadsides." In Missouri one community has named a newly-constructed highway after its first son who gave his life in the service. Improvement of highways and tree planting go hand in hand and trees are being planted along highways in many parts of the country. Different species of trees are to be planted along the various roads in Michigan for which \$50,000,000 has been voted, according to W. S. Linton, of the state tax commission and a member of the state good roads association. Along the highway from Chicago to

suitable seeds, scions or trees for planting under the provisions of this act, and to establish proper rules and regulations for distributing the same at nominal cost, or otherwise, to counties, townships, cities, villages, and citizens of the State for the aforesaid purposes, and also for State parks or other public places.

"It shall be unlawful to cut, destroy, injure, deface or break any ornamental, nut bearing, food producing or shade tree upon any public highway or place, except where such trees shall interfere with the proper construction or maintenance of such highways. It shall be unlawful to affix to any such tree any picture, announcement, play-bill, notice or advertisement, or to paint or



ANOTHER PLAN FOR MEMORIAL PLANTING

Here is an example of how cities are planning beauty spots to include both memorial and the planting of memorial trees. This suggestion by E. Burton Cooke is for "Pershing Park" in Atlanta, Georgia.

Saginaw walnut trees are to be planted and this will be called the Victory Highway. The people along the route have promised, he reports, to improve and beautify their property. This is a good illustration of the way in which tree planting leads to other civic improvements.

A tree planting bill introduced by Senator Harvey A. Penney has passed the state legislature and been signed by Governor Sleeper which makes a special point of food producing trees. It provides among other things as follows:

"The Michigan Agricultural College and Public Domain Commission are hereby authorized to grow and acquire

mark such tree, except for the purpose of protecting it, or to negligently permit any animal to break down, injure or destroy any such tree within the limits of any public highway. Any person violating any of the provisions of this act shall be guilty of a misdemeanor and on conviction thereof shall be punished by a fine of not less than one dollar or more than twenty-five dollars, and in default of payment of any such fine may be imprisoned in the county jail for a period not exceeding thirty days. Such person shall be liable to the owner of the trees for treble the amount of damages sustained."

A resolution favoring the memorial tree plan of the American Forestry Association and urging the people "to plant nut-bearing trees wherever possible," has been adopted by the Paper Shell Pecan Growers' Association, of Illinois, J. M. Patterson, president, and Robert S. Carson, secretary.

In Fort Wayne, Indiana, a new park has been started in the east end of the city to be known as Memorial Park. It will be forty acres in size and will have a memorial grove of four and a half acres planted with oak trees, each tree in memory of a fallen soldier.

Rotary clubs throughout the United States have been leaders in many cities in adopting the memorial tree method of honoring their members. In Jacksonville, Florida, the club has given its approval to a plan for the purchase of a large city block which would be converted into a memorial park with an arch in the center and with groups of trees. S. H. Squire, president of the Elyria (Ohio) Rotary Club, reports the planting there of thirty-eight Norway maples in the grounds of the hospital in honor of the men from that town who gave their lives. Other civic organizations participated in the ceremony.

Don E. Mowry, general secretary of the Madison (Wisconsin) Association of Commerce, reports that the Girls' Civic League of the Association has planned to plant memorial trees in that city.

There are many places and much land not suited for agricultural or other purposes but which would make excellent land on which to start trees. The Michigan Agricultural College through its forestry department

is planning more than 75,000 trees among the sand dunes in some of the Western Michigan districts in an effort to check the shifting of these big sand piles. It is estimated that the trees which the town of New Bedford, Massachusetts, has set out in the past few years will be worth at least \$1,000,000 in twenty-five years. This commercial phase of the matter is worth any town's consideration. New Bedford claims to hold the record in New England for the number of trees in proportion to its street mileage.

In France they are going to convert historic Vimy Ridge which saw some of the bloodiest and fiercest fighting of the war into a vast memorial park to the Canadian soldiers. Pitted as it is with shell holes and craters made by mines it can never be turned again into agricultural land; and so the Canadian government will plant on it the maples of Canada. It has been suggested that in the same way the Argonne be made an American park, a shrine hallowed by the blood of American soldiers.

No meaningless memorials are those which are being erected today in city, town and hamlet to the sons of America who fought to preserve liberty and freedom. These memorials are taking on the form of community center groups of buildings, parks, playgrounds and recreation places. Thus combining utility with beauty, they will keep ever fresh the memory of the sacrifices made by the nation's heroes and serve both the present and the coming generations. In this united service tree planting takes a prominent part.

A NATIONAL FOREST POLICY--WHY AND HOW

THE solution of the forest problem in the United States depends largely on what is done with the private forests. Even with the most liberal sort of a policy looking to the protection of our public forests, including the acquisition of additional areas, it is upon the private forests that the future largely rests.

This is emphasized by a few striking facts which have recently been pointed out by Henry S. Graves, Forester, United States Forest Service. Colonel Graves has called attention to the fact that 97 per cent of the timber and other wood products used in the United States is obtained from privately-owned forests and that less than two per cent of the saw mills of the country are operating on public forests. Private owners hold four-fifths of the nation's standing; furthermore this is the best and most accessible timber. Almost the entire supply of certain important commercial species, such as white pine and spruce, southern pine, cypress, redwood and most of the hardwoods, is in the hands of private owners.

It is certain that few people realize the seriousness of the situation. There is need of an awakened public consciousness in order that remedies may be applied before it is too late for them to be of any avail. As Colonel Graves points out "we have hardly begun to stem the tide of forest destruction;" and there is need not only of a large program as far as the public forest lands are

concerned but even more a radical change in regard to destructive cutting on private forest lands.

So rapidly is the available supply of timber being exhausted in some parts of the country, the South and the East particularly, that if the war had come fifteen years later "we would have had very great embarrassment in obtaining even the lumber needed for general construction," as Colonel Graves points out, "except at great sacrifice of time, cost and crowding of the railroads." Most of the lumber would have come from the Pacific Coast. Here are a few further facts in this connection which it is well to consider. Most of the original supplies of yellow pine in the South will be exhausted ten years from now, according to the manufacturers, and within the next five to seven years more than 3,000 manufacturing plants in that section will go out of existence. This means a moving of the lumber production center to the Pacific Coast.

What such a shift means, with the loss of competitive influence, can readily be surmised when it comes to prices and its effect upon the lumber industry and related trades and occupations. It is estimated that the Lake States whose supplies of timber only a few decades ago seemed almost inexhaustible, according to the narrow views which then prevailed and which still hold in some quarters, already are paying a freight bill of \$6,000,000 a year to

bring in lumber and like products from outside sources. New England is cutting every year for lumber and other uses twice as much timber as is being grown there; and this affects a region which employs nearly 100,000 wage earners and has about \$300,000,000 invested in the wood and forest industries.

What is true of New England is true of nearly every other part of the country. Wood is being cut without provision for proper replacement of the old stock. In cutting on private lands there is little regard for future supply, although some owners and groups are endeavoring to handle their lands constructively, but on the whole destructive processes are permitted which retard or actually prevent the succession of a good forest growth. The welfare of the country, its future economic progress and prosperity, demand that strict laws governing protection against fire and compelling proper cutting which will conserve a future supply, be made to apply to the private as well as to the public forest lands of the United States.

"There are certain things that the public should do, and in a liberal spirit," declared Colonel Graves, at Boston, "to make forestry by private timberland owners possible and effective. At the same time the public should insist by adequate legislation that the destructive processes be stopped, and that methods be adopted which will leave the forests in a productive condition. To secure these ends there is necessary a broad program that is practicable and equitable, based on consideration of existing economic conditions." In his Chicago speech the Chief Forester expressed the belief that along certain lines "the lumbermen are going as far as they can to improve the internal situation."

But there are certain big phases of the situation, he went on to argue, which call for co-operation between all interests concerned, between the national and the state governments, the lumbermen and the public and existing agencies, in order that the welfare of all may be conserved. For the question of forest renewal which is the backbone of the whole situation "is not only of interest to the public," he says, "but it is of vital concern to the owners of timberlands."

There is need for prompt action, Col. Graves makes clear. He declares that there is growing "public uneasiness" and that "public demand for action is increasingly insistent." Efforts of a local character, or which do not deal with the problem in a big national way, will not answer, he says. "Now is the time, therefore, to bring about action in accordance with broad constructive plans, rather than by piecemeal legislation by the different States, uncorrelated with each other, and with action of the Federal Government."

As to the action which he has taken looking toward the adoption of a national forest policy, the head of the Forest Service announces that he has initiated "a series of conferences with forest agencies of the states and with representatives of interested institutions and organizations." These conferences, he hopes, will form the basis in "laying the groundwork for a national policy."

Among some of the facts to which Col. Graves calls attention in connection with his discussion of the problem are the following:

1. The original supplies of yellow pine in the South will be exhausted in ten years; and within the next five or seven years more than 3,000 manufacturing plants will go out of existence.

2. Within the last 10 years new mill development for news-print manufacture in this country has almost wholly ceased, while in Canada during that time no less than 28 mills have been built, largely with American capital.

3. The Lake States, which a few years ago were the greatest producers of timber, are today paying a freight bill of about \$6,000,000 a year to bring in lumber and other products from outside sources.

4. It is estimated that fully 30 per cent of all the lumber now used in New England comes from outside the region; and this is in addition to the importations of large quantities of pulp wood.

5. Many important wood-using industries are already embarrassed for supplies.

"The policies of the Government and the States during the next few years in matters relating to forests and lumber will be of far-reaching importance," says Col. Graves. "Conditions created by the war present certain problems of urgent interest to the lumber industry that will require definite action by the Federal Government." There are conditions, he asserts, "which both from the standpoint of the lumber industry and of the general public welfare demand constructive action."

In pointing to the urgent need of a national forest policy, the Chief Forester makes this statement: "The dissipation of our forests goes on with no let up, and still for the most part without any provision for the continuance of the forests after lumbering. Exhaustion of local forest supplies, the closing of industries dependent on them, the embarrassment for supplies of the pulp mills and other consumers using special classes of forest products, the generally mounting prices to consumers, are other factors which are calling sharp attention to the effect of forest destruction, and are causing increasing public uneasiness." He declares that lumbermen are giving thoughtful attention to the needs of the industry and they recognize that many things of a helpful and constructive character can be done within the industry in the way of cost accounting, economies in manufacture, scientific merchandising and so on.

"But neither the lumber industry nor the public can ignore the fact," he goes on, "that the great fundamental problems, which not only involve the permanence and stability of the interests dependent on our forests, but also gravely affect the national welfare, are not being solved."

These problems he divides into four general groups:

1. Those relating to the causes of over-production.
2. Those that concern the supply, character, well-being and stability of labor.
3. The problem of the continuance of private forests and of stumpage supply; and

4. Certain questions relating to the public forests.

As to the first of these—over-production—he says that “the elements which caused the unstable condition of the lumber industry prior to the war still remain, and constitute a danger for the future.” Speculative character of timberland ownership, pressure to liquidate, difficulties of financing stumpage, excess mill capacity, the unorganized character of the industry, these were among the factors, he declares, that led to premature cutting and over-production, with its depression, losses, failures, interrupted operation, intermittent employment and other ills. “I do not see,” says Col. Graves, “how there can be a permanent basis of conservatism, stability and individual strength so long as this condition exists.”

“The public is concerned because of the injury and loss that accompanies demoralized industrial conditions, and because under such conditions there is increased waste in lumbering, protection from fire is less efficient, and the difficulties in the way of forest replacement are intensified. Failures that occur at such times often result in a transfer of lands, thereby increasing the tendency to centralization that may operate disadvantageously to the public in the long run.”

Taking up then the labor problem, this is the summary of the opinion: “Temporary adjustments will doubtless be found, but a final solution will come, I believe, only with the placing of the lumber industry on a basis of stability and permanence.”

Concerning waning timber supplies, the Chief Forester asserts: “We have been lulled into a feeling of security in recent years because we have an estimated total quantity of standing timber in excess of twenty-five hundred billion feet. The very situation to which I have referred of industrial instability due to the pressure of large quantities of stumpage for production adds to the impression that we have so much timber in reserve that we do not need to concern ourselves about supplies of forest materials.”

“Not only the public, but many economists, have been misled by statistics showing the aggregate of timber still standing in the country. Forest depletion is injurious long before the last tree is cut and long before all but the last center of production is exhausted. When local resources are so depleted that industries close, the question of vanishing supplies takes on a new significance. And this is exactly what is happening in hundreds of communities. The forest supplies are used up; the chief industry, a sawmill, a box factory, or a wood-working establishment closes. Subsidiary industries dependent on the primary undertaking have to close also. And what is more, the land formerly producing the timber, if non-agricultural, is left in an unproductive condition and a burden for many years on the community.”

Col. Graves referred to “many important wood-using industries.” As “already embarrassed for supplies,” especially acute being the situation faced by the manufacturers of news print paper in the northeast, in the Lake States and elsewhere, who had enormous

investments in mills, water power and equipment.

But it is not so much the amount and character of timber now standing which concerns him as the production of new crops. “I would have little concern about the amount of timber used if we were growing new stands in place of the old. We have enough non-agricultural land to produce for all time timber in abundance for ourselves and for export. But this would require keeping our forests in a productive state after lumbering.

“We are not doing that,” he continues. “Our forests are steadily deteriorating under cutting and fire. No effort is made for replacement after cutting. We are still drawing for the most part on original sources of supply. Failing to replace these, we are steadily losing ground.

“The question of forest renewal and growth is one that can no longer be ignored. It is not only of interest to the public but it is of vital concern to the owners of timberlands.”

After expressing the opinion that “the transfer of great bodies of timber from public to private hands was a grave mistake of public policy,” although “the action was taken and we can not undo it,” Col. Graves asserts that the problems resulting from this policy cannot be ignored “and whether they like it or not the private owners have the problem of the right handling of a large part of our forests actually on their hands.”

“On the other hand the public has a very essential interest in the question of keeping the lands in a producing condition so as to render a maximum of service, in supporting industries and local communities, and in serving to support through tax levies public enterprises of various kinds. Even though the public has surrendered its direct ownership of the timberlands, it cannot afford to permit them to be handled in a way injurious to the welfare of the community.”

The existing public forests are not extensive enough or widely enough distributed to meet more than a part of the public needs, the Chief Forester points out; and so “we must continue to rely in considerable part on private lands, both for present supplies and for growing timber for the future.”

This private ownership combined with a public responsibility which “has never been fully sensed or accepted,” results in a “perplexing dilemma.” “It appears to me that the situation is an impossible one that cannot long continue.

“As I see it,” he declares, “either private owners must assume the full responsibility of properly caring for their timberlands, including protection and forest renewal; or the public must take over the responsibility that it once had and surrendered; or the public must share with the owners both the responsibility and the burden of securing the objectives that are essential to safeguard the public welfare. My own view is that the last is the only fair and practical method from the standpoint concerned.”

In speaking of the public forests and their needs, the head of the Forest Service says that although they are being protected from fire, the timber being used as called

for by economic conditions and the cutting conducted so as to leave the land in favorable condition for the next timber crop, nevertheless there is need even from the standpoint of the handling of the public forests of a correlated public or national policy. This is true because "the manner in which the public timber is handled may vitally affect the lumber industry" and because "the problems of the lumber industry may affect the interest of the Government in the administration of its own forests." The question of cut-over non-agricultural lands and to what extent they should be taken over by the public, especially those on critical watersheds and on steep slopes, these and various other problems must be considered in connection with the forest situation as a whole.

"The problems which I have set forth," says Col. Graves, "touch many interests, both public and private. Their solution involves Federal and State legislation; and also involves co-operation between public agencies and the lumber industry. The different problems are closely interrelated with one another. Moreover, action in one section of the country concerns the interests of other regions. These circumstances make it clear that for a final solution there must be a far-reaching program that will enable the Federal Government, the States, communities and the industrial forces to unite in a common effort. Many efforts have been made to find a solution for some industrial features or some public features of the forest and lumber problems, and have failed because they have left out of account some outstanding question that must be solved at the same time."

Remedies hitherto proposed have had serious defects and have proved inadequate, in the opinion of Col. Graves; and he cites as an instance, the proposal made when the Clayton Act was under discussion that agreements be permitted which would allow curtailment of production when justified by industrial conditions. This and a similar proposal put forth in a referendum by the Chamber of Commerce of the United States, had two serious defects: "The vital object of the public to secure a continuance of the forests is wholly left out of account, and it would not, in my opinion, be really effective in bringing about a condition of permanent stability."

A second suggestion which he mentions, namely, that the public co-operate in the conservative financing of timber holdings through long-term loans at low rates of interest, is "only a half-way measure," in Col. Graves opinion, and "does not make any provision for the permanence of the forest." As to "tax reform" he declares that this would not accomplish the desired results. The various forms proposed "have made little headway, because for the most part they have not provided for meeting certain economic difficulties."

"In approaching the question of a national lumber and forest policy," says Col. Graves, "involving perhaps some radical departures from the present principles of relations between the public and industry, we shall find, I believe, that the most important and fundamental questions relate to the speculative character of forest owner-

ship. Such ownership means cutting as fast as possible and without reference to how the land is left after lumbering. What is needed is some strengthening influence that would make possible the husbanding of the resource and its conservative use, as the public would use it if it had retained control over it and at the same time provide for the continued productiveness of the land.

"I am ready to advocate a policy more far-reaching in all respects than has generally been offered. I would afford whatever public assistance is needed to make possible the conservative handling of our forests, and I would then make fire protection, conservative production of lumber, and right methods of removal a matter of requirement, with such public direction and control as is necessary to realize the aims desired by the public."

The action required "may vary in different regions," according to Col. Graves. It may be a combination of several methods of public co-operation; in some localities the tariff or local taxation may play a large part in the situation; again the adjustment of international relations, the reform of taxes and other public measures must be considered; or where public and private lands are intermingled a plan that would co-ordinate all forest lands within economic groups—these are some of the factors which, it was said, would have to be considered.

"In all regions there is needed a broad policy of forest development, a policy which makes for permanent mills and all that means to the employment question, which places timber on the market only as it is needed, which protects the present resource—a difficult matter now even under the most earnest efforts to co-operate—and which classifies the land, encourages agriculture, puts to its best use every acre, and secures tree growth on non-agricultural lands."

The Chief Forester declared that he is in favor of "a greatly enlarged program of acquisition" of cut-over non-agricultural land, second-growth forest and protective forest which should be well distributed through all the forest regions and as they are acquired should be organized as municipal, state or national forests.

MINNESOTA will have a forestry appropriation of \$85,000 this year, due to a change of heart toward the state forestry department in the closing hours of the State Legislature, which resulted in saving that department and the aforesaid appropriation of \$85,000 a year. This is \$35,000 a year more than was allowed two years ago. It is specified that not more than \$10,000 be spent for reforestation, and not more than \$12,000 for administration. The balance, \$63,000 a year, is to be spent for forest fire prevention and protection.

THE tallest trees of the United States, says the *Canadian Forestry Journal*, are the California redwoods or the Douglas fir. Both claim the distinction of being the tallest, and it is an even match between them. A maximum of about 350 feet is the greatest, though a little more than that has been claimed. There is no question that in trunk diameter the redwood, that species known as sequoia, is the champion.

EXCLUDING ENEMY ALIENS WITH APPETITES DE LUXE

BY CHARLES LATHROP PACK

PRESIDENT, AMERICAN FORESTRY ASSOCIATION

A \$500,000,000 banquet to alien enemies has been given annually by the American public. These aliens were not invited here, have performed no service, and yet have been fed on the fat of the land, adding to the high cost of living. They have tremendous appetites, consuming trees or entire forests, garden crops and fields of grain and cotton. These undesirable citizens that have made America their adopted home are insects and plant diseases which have been introduced from foreign countries. The recent quarantine issued by the Secretary of Agriculture, restricting the importation of nursery stock, assures us that the treasonable activities of these enemy aliens will be curbed in the future.

There's a pest for every plant. Adam must have been an aged man before he got married if he first took time to name all of the insects and fungi. It would require the life-time of an ordinary man even to pronounce the names which scientists have given to the known species and every day sees new discoveries added to these lists. The gardener and the fruit grower, the farmer and

the forester spend a great deal of time and money in combating pests. Some plants have more than a thousand insects and fungus diseases which attack some portion of them, causing death or injury. However, most of the pests which attack our plants are native to America and have natural enemies which keep them in check. "And all those fleas have little fleas, upon their backs to bite 'em; and those again have lesser fleas, and so *ad infinitum*." Thus native insects have a host of voracious enemies, including birds, animals, and other insects, which preserve the "balance of Nature." The ravages of native pests seldom become devastating except occasionally in small areas and for a short time when conditions become exceedingly favorable for their rapid propagation.

Hitherto, America has maintained an open door to plant immigrants and, year after year, destructive insects and plant diseases have come to this country on these plants from abroad. Some of these pests have found the Land of Freedom entirely to their liking. Sometimes the climate here has been exceptionally favorable for their rapid development, at other times they have found new

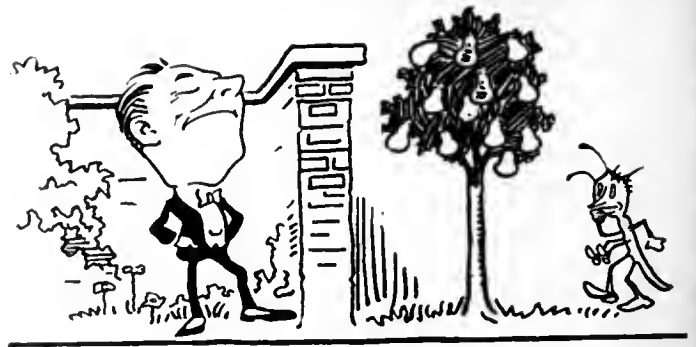


THE LANDING OF THE PILGRIM FATHERS

food plants. In such cases they have propagated rapidly because the balance of Nature was no longer maintained. They escaped from the enemies which held them in check in their own country, with the result in many cases that they increased so amazingly and wrought such tremendous damage that even the easy-going "pacifist" American public has been forced to fight them. In most cases, however, the fight against imported plant pests has been begun too late. We have waited until they became so thoroughly established over a wide area that it has been too expensive to apply eradication measures that would have been effective in the beginning.

Comparatively recent experience with imported pests has made it apparent that the bug is blightier than the sword. The uncontrolled ravages of the late blight and rot of potatoes in 1916 was responsible for the shortage in the potato crop which sent prices soaring and brought the humble spud into prominence hitherto unknown. Powdery scale and scurf are two other potato diseases which have been brought in from abroad. More recently, the potato wart disease, established in Pennsylvania from European importations, has given cause for alarm. The Hessian fly, introduced from Europe in Revolutionary times, causes an average annual loss to the wheat crop of fifty million dollars, and in some years the loss from this one insect has exceeded 100 million dollars. The loss of fruit due to the codling moth, together with the money spent in controlling this insect, costs the United States about 16 million dollars a year. Another imported fruit insect, the San Jose scale, entails a loss of at least 10 million dollars annually.

The tale of the gypsy moth, in ribald rhyme, illustrates



WHERE, OH WHERE IS MY LITTLE TREE GONE?

what happens when an insect reaches the United States from another country. To paraphrase:

There was a man who freed two moths,
And those two moths were mothers,
That year there were a million more,
The next a million others.

They had tremendous appetites,
And wrought great devastation,
Until the State with wrath arose,
And fought like Carrie Nation.

In this case an investigator was experimenting in Massachusetts with two gypsy moths imported in connection with an experiment in silk culture. Unfortunately the door of the cage was accidentally opened and the insects escaped. The investigator immediately notified the authorities of the danger but no attention was paid to the warning. A few years later the trees on a small area were defoliated but still no concern was manifested. However, the next year the insects became so numerous that a large territory was invaded by them and the authorities at last woke up. A fight was begun which has lasted for years and today it has cost more than 15 million dollars in cash for applying control measures, beside many times this amount of property damage.

"What next?" is constantly asked by the nurserymen, fruit



THE RAVAGES OF CHESTNUT BLIGHT

A forest of American chestnut trees destroyed by the chestnut bark disease, a pest introduced from China. This disease passes directly from one chestnut tree to another and no remedy has been found for it. The disease was first found in the vicinity of New York City, in 1904, since which time it has spread to Massachusetts, and southern New Hampshire, western New York, Ohio, West Virginia and North Carolina.

growers and farmers, when told of a newly imported and dangerous plant pest. It would seem as though the time had arrived when in order to grow a tree it is necessary for the one who wishes to harvest its fruits to stand guard over it day and night, armed with a spray can. Many a man has planted a tree and dreamed of the enjoyment he would derive from it as he rested under its benign shade, only to awaken some morning and cry "Where, Oh, where is my little tree gone?" Observe the classic example of the chestnut blight. This is a bark disease which was brought to this country from the Orient on Japanese chestnut nursery stock. It was first found on western Long Island in 1904 and two years later it had reached southward to Philadelphia. In ten years it spread over half of the chestnut area of the

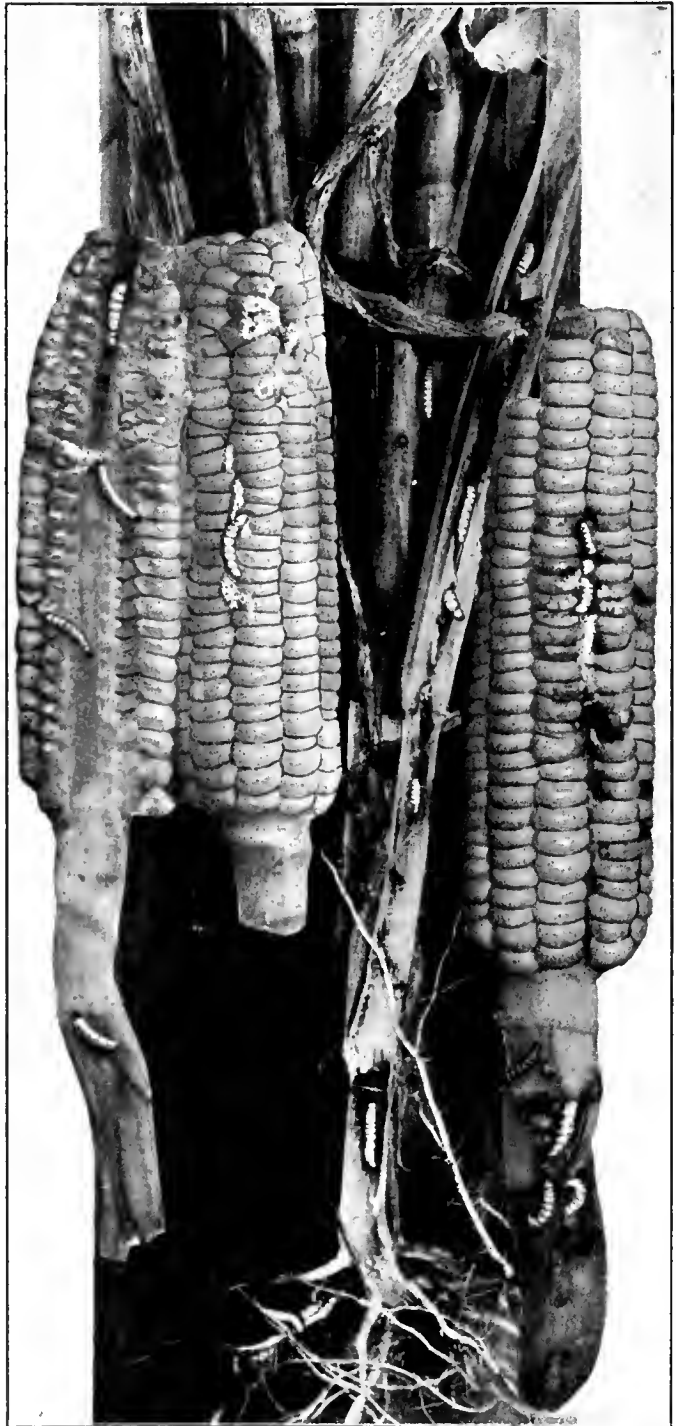


AT THE END OF THE STRUGGLE FOR LIFE

This once magnificent chestnut has now almost succumbed to the chestnut blight. It is difficult to estimate the enormous financial loss caused by this disease, but a hundred million dollars would seem to be a conservative figure.

United States and at the present time it has practically exterminated the chestnut trees within a 100-mile radius of New York and is rapidly accomplishing the complete ruin of our magnificent chestnut forests of the South. The loss caused by this single imported pest is many million dollars and its ultimate end will be the extinction of one of the most useful and most profitable American forest trees. Only recently it was found that a similar disease attacking the poplars had been imported from the nurseries of France and had spread over a wide area of the United States.

Other dangerous pests introduced from abroad are the Oriental peach moth, the Japanese beetle, the European earwig, the Leopard moth, the alfalfa weevil, the European celandine, and the European corn borer. The latter is a pest which apparently was brought to the United States in a cargo of hemp unloaded at a rope factory near Boston, Massachusetts. It is exceedingly destructive to corn, feeding by boring in the stalk. In its operation it works upward, eating out a chamber from the



Photograph by courtesy Massachusetts Department of Agriculture

BEWARE OF THE EUROPEAN CORN BORER!

The European Corn Borer has made its appearance in Massachusetts, Connecticut and New York. The corn borer was probably brought into this country several years ago, possibly on hemp, and from its present distribution it would seem as though it was first established in or near Charleston, Massachusetts. It has spread rapidly and is now known to be present in not less than thirty towns in Massachusetts, mostly north and northwest of Boston.

This insect winters over as a caterpillar in corn stalks and some of the larger weeds. About the middle of May it pupates and emerges as a moth which lays a large number of eggs, sometimes as many as 700. The caterpillars from these eggs feed upon early corn and weeds and do considerable damage. About the last of July these caterpillars pupate and early in August another generation of moths appear. These lay their eggs (this time about 900) on corn and weeds (principally corn) and do a vast amount of damage, feeding on the stalks and ears of corn. It is this caterpillar or borer, that passes the winter in the corn stalks and large garden weeds, such as pigweed, ragweed, and barn-yard grass. The caterpillar which was present in the old corn stalks early in the spring has been responsible for 315,000 borers up to the first of October. As this insect passes the winter in corn stalks and weeds, very effective destructive measures are offered. Pull up and burn all corn stalks together with all old vines and all large weeds throughout and around the garden.

path. The developing ears are also sometimes hollowed out. As high as 90 per cent of the stalks in a corn field may be infested. Over 200 borers have been found in the stalks growing in one hill of corn. Control is made more difficult by the fact that the borer feeds on a number of other plants, including the stalks of weeds and flowers, and may live over winter in grass roots.

Many people believe that we have been bringing in plants from abroad for so many years that now we have

all of the pests to which plants are heir. This is a mistake, in the opinion of plant physicians who are best qualified to know. The Bureau of Entomology, United States Department of Agriculture, has published descriptions of over 3,000 distinct insect pests which are likely to be introduced into this country and cause serious loss. About half of these are European insects which feed upon forest and shade trees and the balance infest various cultivated crops. Among the important insects which it is hoped to exclude from the American continent are the Mediterranean fruit fly, considered by entomologists to take first prize

as a destructive fruit pest, and the pink boll worm of cotton, from Mexico, which is capable of making the best efforts of the cotton boll weevil appear puny in comparison. The life stories of some of these pests, as unfolded by years of study on the part of patient scien-

tists, are so amazing as to be classed with fairy stories by those who are little acquainted with the wonders of Nature. White pine blister rust is an instance. This parasitic fungus is native to the Old World, attacking the stone pine and other native five-leaved pines of Europe. When extensive interest in planting forest trees first began to develop about a score of years ago, white pines imported from Germany, France and Holland, brought this disease to the United States, principally in 1908 and

1909. Curiously, the safety of our white pines depends entirely on whether we can control the spread of the disease on currant and gooseberry bushes. The fungus cannot go directly from one pine tree to another but first must spend part of its life on currant or gooseberry leaves and in this stage it has the power of spreading rapidly and widely to other currant and gooseberry bushes. The fungus then develops another stage by which it is enabled to pass from the currant or gooseberry bushes back to the pines. If we destroy the currant and gooseberry bushes we prevent the disease from



Photograph by W. S. Carpenter, New York Conservation Commission
STRANGLING TO DEATH

A native ten year old white pine tree which has been girdled by the white pine blister rust, a fungus of foreign origin first found in America in 1906. The cankered area above the ax is due to the killing of the bark by the growth of the fungus. The disease has progressed to such an extent that the sap is being cut off from the top and the tree is in the last stages of destruction. This disease cannot be transmitted directly from pine to pine but must pass through an intermediate stage on currants or gooseberry bushes. To prevent white pines from becoming diseased, remove all currant and gooseberry bushes from the vicinity of the trees.

infesting our white pines. Hence, improbable as it appears to the uninitiated, the salvation of these magnificent trees depends to a large degree on whether people are willing to forego the luxury of currant jelly and gooseberry jam. Congress has passed a literacy test

which will bar undesirable human immigrants, but there is no test which we can apply to exclude the army of injurious insects and plant diseases from abroad which enter as stowaways on nursery stock and other plant material.

The system of inspecting the importations of foreign nursery stock has proved ineffectual because the eyesight of the most competent inspector is not capable of discovering every insect or plant disease on every plant. Many of them, especially fungi, are hidden under the bark and are entirely invisible. It must be remembered that of many of these pests we have no conception, based on experience in its native land, as to its destructive powers under American conditions. Fumigation has been tried but it is manifestly impossible for any gas or liquid to penetrate to the interior tissues of a plant where fungus or borer may be hiding. The question "what shall we do about it?" has been answered correctly by the Federal embargo, which prohibits further importation of plants from abroad except such as are specifically sanctioned by the United States Department of Agriculture.

The United States is the last great nation to adopt measures to adequately guard against the dangers incident to the introduction of foreign nursery stock. We have thus wasted millions of dollars annually, and there remains the possibility of complete extermination of certain valuable economic plants. It is fitting that this action by the United States Department of Agriculture is taken now when we must conserve all of our National resources to help pay the huge expense of war.

There is always the possibility of bringing in pests in cargoes of merchandise, but the action taken by the Federal Horticultural Board, backed up as it undoubtedly will be by adequate supervision, is certain to prevent great losses in the future. An additional factor of safety is the recently organized American Plant Pest Committee, composed of State agricultural and forestry officials, entomologists, pathologists, and others interested in safeguarding the crops of farm and forest. The purpose of this Committee is to secure quick action for the suppression or control of dangerous pests as soon as they are discovered.

CANADA TO HELP FRANCE

BY ELLWOOD WILSON

G. C. PICHE, Chief Forester of Quebec, has just returned from some months' stay in France and says that the continent will require a great quantity of lumber, especially France and Belgium. Before the war, France was importing three million cubic meters, and Russia was supplying one third of this. The war has so depleted the French forests that they will require at least twenty years rest to be in position to furnish their normal yield. The demand will be much heavier than in the past owing to reconstruction needs and new industries, and will amount to about eight million cubic meters per annum. Canada and the United States will be able to supply a large part of this.

It would be advisable to help the French in their re-

forestation work. The Norwegian Society of Foresters is going to reforest at their own expense 250 hectares. It is suggested that Canadians should plant a tract on say, Vimy Ridge, with Canadian trees, maples perhaps.

The French Forest Service has suffered heavily during the war both by the loss of men and the lack of new men entering the schools. They are short one-third of their personnel which with the addition of the forests of Alsace-Lorraine, will accentuate their difficulties. They are considering a modification of their organization by giving more authority to inspectors.

The School of Forestry was reopened in December, 1917, in the building of the Institut Agronomique, in Paris, rue Claude Bernard. It has also suffered greatly by the war. Now that conditions are better the school is returning to Nancy. The French foresters are eager to return to the beloved forests of Alsace-Lorraine. The Serbs have an important group of young men at the school and it is expected that many more will come from Jugo-Slavia, Czecho-Slavia and Roumania.

A letter received from a prominent Norwegian forester says that there was no crop of *Picea Excelsa* last fall and that no seed is to be had. He also says that conditions in Russia are bad and that labor in Norway is somewhat infected by the virus of Bolshevism.

A letter from a Spanish forester says that conditions of unrest are disquieting and an anti-Bolshevist league has been formed.

LET TREES TELL THEIR GLORY, NOT OUR SORROW

WOULD not memorial groves—living, growing emblems of our sorrow and our pride—be more fitting monuments to our dead in the great war than anything made with hands? Would they not better carry their memorial message to this generation that mourns, and to unborn generations yet to be instructed and inspired? This is the sentiment expressed in *Country Life* in calling attention to the plans of the American Forestry Association both for memorial tree planting and registering such plantings in a national honor roll, as well as its work of helping reforest the devastated battle areas of our Allies abroad.

"What is it that clamors to be told—told now, and told for all time?" Miss Grace Tabor asks in writing on the subject in the magazine. "Not grief at loss, nor personal sorrow, nor even yet a national mourning. These things need comforting, not telling. Thus it is apparent that a very definite and possible thing is proposed in memorial trees—a thing quite as definite as any hitherto known form of monument or memorial even though it is not consummated by the blue print or the stone mason route. That it ties up with the great reforestation work of our own American Forestry Association in France makes it of deeper significance still. For these forests—millions of acres of them—will likewise inevitably be memorial groves to the American dead even though they were not planted to this end. France will make them so for France never forgets."

TREES AS WIRELESS TOWERS

THE tree is a piece of electrical apparatus. During the war trees in this country received wireless messages from the principal European stations for the information of the General Staff of the American Army. This most interesting and important fact is revealed by Major General George O. Squier, chief signal officer of the United States Army.

From ships at sea radio messages were communicated by way of trees to the various receiving stations in different parts of the United States.

Radio telephonic messages from airplanes were readily received by the tree-antennae arrangement. These messages were then transferred to the wires of Washington, D. C., and relayed to any desired point. Thus the linking up of the wire and the wireless methods of communication was found to be convenient and efficient.

General Squier pointed to the significance of the facts which he presented as an evidence of the value of "the physical method of studying all sciences," and he expressed the hope that the data in regard to trees as potential wireless plants would furnish "points of departure for further research."

"The physicist and engineer, accustomed to deal with inanimate matter," he said, "is here confronted with the employment of living vegetable organisms of growing trees. From the moment an acorn is planted in fertile soil it becomes a 'detector' and a 'receiver' of electromagnetic waves; and the marvelous properties of this receiver, through agencies at present entirely hidden from us, are such as to vitalize the acorn and to produce in time the giant oak. In the power of multiplying plant cells it may, indeed, be called an incomparable 'amplifier.'"

"For our present purpose, we may consider a growing tree, therefore, as a highly organized piece of living earth to be used in the same manner as we now use the earth as a universal conductor for telephony and telegraphy and other electrical purposes."

THE Massachusetts Forestry Association announces a most attractive itinerary for the 1919 trip of its members to the National Parks and National Forests. While the purpose of the tour is primarily educational, in making known to our people their great, public playgrounds, it also affords an essentially restful, invigorat-

The Chief Signal Officer called attention to the fact that experiments which had been conducted before the war had shown the possibilities in this direction but that "with the sensitive amplifiers now in use it was possible to receive signals from the principal European stations by simply laying a small wire netting on the ground beneath the tree and connecting an insulated wire to a nail driven in the tree well within the outline of the tree top."

"It was soon found," said General Squier, "that a tree-antennae could be used efficiently as a multiple receiving set over widely different wave lengths, receiving either from separate terminals at the same or different heights of the tree or in series from the same terminal. This same type of circuit was employed in an inverse manner for telephonic transmitting purposes although the experiments thus far have been limited to short distances.

Furthermore telephonic transmission through the tree-antennae was received by another tree-antennae and automatically returned to the sender on a wire system, thus making the complete circuit."

The value of trees in the study of many of the earth's physical problems was emphasized by General Squier, who quoted from an earlier report he had made on the subject, as follows:

"Our great forest areas may exercise an influence in maintaining a general equilibrium between the electrical charges of the upper atmosphere and the earth, which has not been fully realized. On this point comparisons between observations from the interior of great desert areas devoid of any vegetation, with those from other portions of the earth's surface well covered with forests, would be instructive.

"From this viewpoint the general surface of the earth may be considered as supplied by nature with innumerable meteorological observation towers, which possibly may be employed by means of apparatus involving principles already well known to science."

THE TREE—SERVANT OF MAN.

"All through the ages there is shown in literature a feeling of reverence, sympathy and human intimacy with trees. It is significant that this practical thing possessing utility and natural strength, architectural beauty of design, and endurance far superior to artificial structures prepared by man, should be able yet further to minister to his needs."—Maj. Gen. George O. Squier, Chief Signal Officer, United States Army.

ing and delightful way to spend an ideal vacation. The Association hospitably invites its members to make up parties and bring their friends and full information regarding the trip may be had by addressing Mr. Harris A. Reynolds, Secretary, at 4 Joy Street, Boston, Massachusetts.

WANTED—BACK ISSUES

We Need Copies of American Forestry for April, July and August 1918

HIGHWAY FORESTRY AND HORTICULTURE

BY HENRY W. HULBERT

SPEAKING of useful careers for returned enlisted men, handicapped it may be in one way or another for ordinary occupation, let me refer to one line which has been in my mind for a dozen years, and which seems to me altogether practicable. In every rural township in America the roadways take up a very considerable acreage, which, for the most part, is kept in a very unsightly condition and is left to be the breeding place of every bug and weed that can do damage to field and forest. Just so long as a highway is fairly passable during nine-tenths of the year the American public seems content. The advent of the automobile and truck is beginning to awaken general public interest in the road question and doubtless we shall see from now on a steady improvement in roadbeds, bridges and all

adjacent land owners. While a considerable portion of this land is so conditioned and suited that it cannot be made valuable for purposes of cultivation, it all can be a menace to the public in one way or another. Every square inch of it is susceptible of being esthetically improved if not of being made strikingly beautiful.

I can see the smile mantling the faces of perhaps the majority when they hear me say the roadsides of every township in America are capable, by proper care, of being made, in the end, rivals of any arboretum now in the country. What they might lack in variety would be made up in beauty and fruitfulness and practical interest; all placed directly before the eye of the passerby. Private ownership and constant economic need and opportunity are sure to lay low sooner or later every forest in the



WALNUTS AS STREET TREES

A highly desirable tree for street planting, under proper conditions of care and control. The walnut is a hardy and beautiful tree, reaching stately dimensions, and it bears a generous crop of valuable nuts.

other similar practical elements that concern transportation. The oversight of the engineering work involved in these improvements should open out to the returned men an increasingly large opportunity, especially as they have become more or less familiar with the wonderful road-systems of Europe.

But the line of activity I have in mind concerns not the roadbeds and the scientific drainage therewith connected, but with the strips of land on either side of these which ought to average on each hand at least twice the width of the roadbed. Here are many thousands of acres owned by the public and which are most often indifferently cared for, or not cared for, by the officials or the

land thus privately controlled. On the highways and in the public parks, especially set aside, alone, may future generations have sure possession of mature specimens of most of our native trees, not to speak of foreign trees that may well be grown for their beauty or other interest.

Having taxed the patience of my readers thus far with an academic presentation, let me hasten to explain how all this can be financed and made practicable. Of course this cannot be done in a day. It will inevitably be the slow growth of years. But it is altogether feasible to begin at once. That beginning is, *to put a man on the job*. To do this will at once call for one of two conditions: (1) Either there must be a public-spirited township that

is ready to assume this added financial burden in good faith that in the end it will be a paying investment; or, (2) one or two or more public-spirited persons must underwrite a three or five years' cost of trying out this experiment. That in the end the permanent establishment of a township highway cultivation plan will be an asset that will pay for itself over and over again is the belief of the writer. Indeed, an efficient handling of the



THE SYMMETRICAL NORWAY SPRUCE

This ornamental species is particularly appropriate for park and road planting.

proposition will go largely toward paying regularly for the annual local layout on its roads.

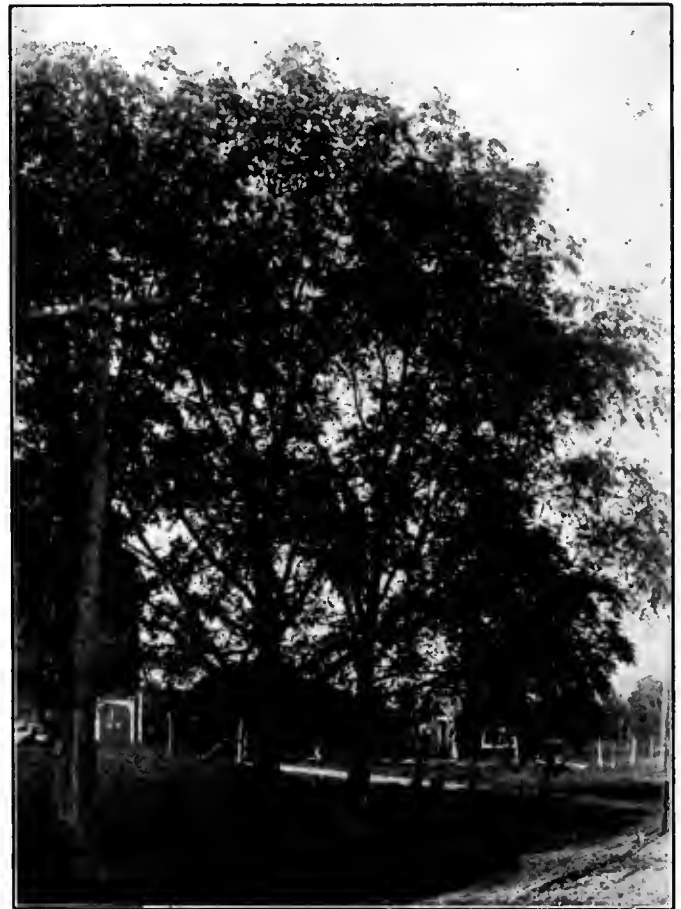
In case there is an efficient County Improvement Society or a County Farm Bureau in operation, any township development along this line of roadside cultivation would naturally link itself up with the larger body. The man on the job locally would be working in harmony with a county-wide scheme of improvement. Indeed, it is possible in some instances that at first a county specialist would be put in charge of this work and, later, have township assistants taken on as the work would develop. But from the standpoint of the writer it would be better to have the man on the job a regular township official, working in harmony with any county scheme at hand.

This man on the job must be well prepared for his task. He should know his soil, his trees (botany in general), his entomology and his landscape gardening. He must be a timber, nut and fruit specialist, who can give satisfactory advice to the farmers. He should preferably be a good teacher of his specialty in all the schools of the township, utilizing thus some of the winter months. He might be the general director of school gardens also. A part of his salary might well find its place in the educational budget. Each year he might bring to the town distinguished specialists along several lines and hold, for a week, a convocation for general educational

purposes. The school children would be present, take notes as a part of their regular school work, write essays, pass examinations on the addresses given, inspired by liberal prizes for excellence.

Under the supervision of the Highway Agricultural Superintendent, and in connection with the Superintendent of Roads, a careful study of the whole system of roads in the town would be made, keeping in mind the relations of the same to County and State roads. Some rarely used highways might wisely be closed, some new ones suggested and others straightened or otherwise improved, so that the generations to come would find that the science and art of our times were faithfully applied. It may be that a broad-minded scheme might be adopted by the township for a generous widening of the roadside areas, especially where ancient plans seem to be too cramped. Cordial co-operation on the part of the land-owners would help immensely to accomplish the end sought.

But long before all this could be accomplished, and even if none of it could be undertaken at once, the High-



WALNUTS FOR SHADE

These comfort-giving trees are planted along a roadside in Michigan.

way Superintendent could get at work. Undesirable trees and shrubs along all the township highways should be cut down and sold for lumber or firewood, or be burned, especially where destructive insects are at work. All good trees should be properly trimmed and doctored, so as to give good chance for growth. Three kinds of

trees should be set out, wherever available places can be found.

(1) Purely ornamental trees would be the first thought of as in harmony with all former ideals. Already much has been done at this by our forefathers as they obeyed the injunction,

"Woodman! spare that tree!" or have set out stately rows of elms, ashes, maples, locusts, poplars, horsechestnuts or evergreens of various species. Local encouragement might easily increase this sort of planting and wise suggestions might improve roadways from an artistic standpoint. But the planting of ornamental trees would be fostered continuously by the Highway Superintendent, with variety as well as quality always kept in mind. Sometime trees will be planted for their form and ele-

gance, like the American elm as distinguished from the "swamp elm" or even the English variety. Again mass of foliage and density will call for the horsechestnut and the maple. Some will be set out for their flowers. The famous cherry tree of Japan is cultivated not for its fruit, but the season of its blossoming is made a public holiday.

(2) A second most important type of tree to be cultivated on the roadside is the nut variety. Here much will depend on climate and soil. No inferior nut tree should be allowed to grow along the roadside, except for



A BEAUTIFUL AVENUE OF TREES LINING A ROADWAY

These magnificent trees are California black walnuts, and the planting is at Rancho Chico, California.

ornamental purposes or for value of timber. High grade hickory trees would prosper in certain districts and could be planted along the roadsides by the tens of thousands. High grade hazel nuts, black walnuts, butternuts, chestnuts (where the blight has passed entirely by) as well as hardy exotics like the English walnut and the pecan. I put in a plea for the much neglected beechnut, provided the quality can be of the best. The tree itself is highly ornamental and should be set out by the thousands in localities adapted to it. In Europe long lanes of beech trees are famous. The Highway Superintendent would be on the watch for new and highly flavored and hardy nuts, and be quick to secure all improved and adaptable species. He should not be afraid of experimenting with unknown quantities, on occasion. Nut gathering week should be a public holiday season. Up to that time the school children have been the special guardians of the nut trees and on the week designated should help gather the public crop on shares. Nut trees that turn out inferior fruit should be grown and cut for timber.

(3) But the main attention of the specialist might well be turned toward fruit culture, which would be the principal subject of his teaching in the schools. At once, on coming to his job, he will trim up and graft all strong apple trees along the



A HANDSOME CHESTNUT, FULL OF FRUIT

The chestnut bears a heavy crop of nuts each year and is, as well, a tree of beautiful contour. Unfortunately, its general planting cannot be advocated, because of the blight which is slowly but surely destroying the species. It is only safe to plant it in certain localities and then it must be watched most carefully.

roadsides, putting in the finest quality of graft. He will dig up the soil at the roots and put on roadscrapings or any other available fertilizer. Then would come the setting out of marketable kinds of apples of high grade wherever the soil and situation warrant it. Many a township could absorb ten thousand Baldwin apple trees with a good grade of peach in between, to be thinned out as the apples grow. Other varieties of apple, as well as pear, cherry, plum, quince, and, to a limited extent, grapes could be added, especially those for canning purposes. Fruit trees can be raised along the highways to the limit of the powers of cultivation and spraying and marketing. When once farmers can see the advantage to them they would be ready to cultivate on shares the trees along their farms in the roadside. By a plan of careful selection, marketing only apples of superb quality a town might get a national reputation for its fruit and command a superior price. All but the best of its fruit could be used at home in a dozen ways almost as valuable from the monetary standpoint. The question of small fruits, such as high grade raspberries and blackberries and blueberries might be taken up and many otherwise barren spots be made beautiful and fruitful as well.

The writer is assured in his own mind that here is a practicable way of adding to a perceptible degree to the wealth of the world, saving waste at least, and furnishing a valuable life work for thousands of intelligent men and women. Indeed women might assume the direction of many phases of this work as well as men. Community leaders along this line would have an enviable opportunity. The educational side of the undertaking is most important and would help bring forward a generation full of big ideas. The plan adapts itself to many new phases of activity, such as the Boy and Girl Scouts, the County Y. M. C. A. development. Let one township do the thing effectively and others are bound to follow so healthful and fruitful an example. The specialization involved in the plan would bring a unity to the rural life of the community and develop many unexpected values to the town.

A SIMPLE WAY TO DESTROY CATERPILLARS

BY EDWARD P. SPERRY

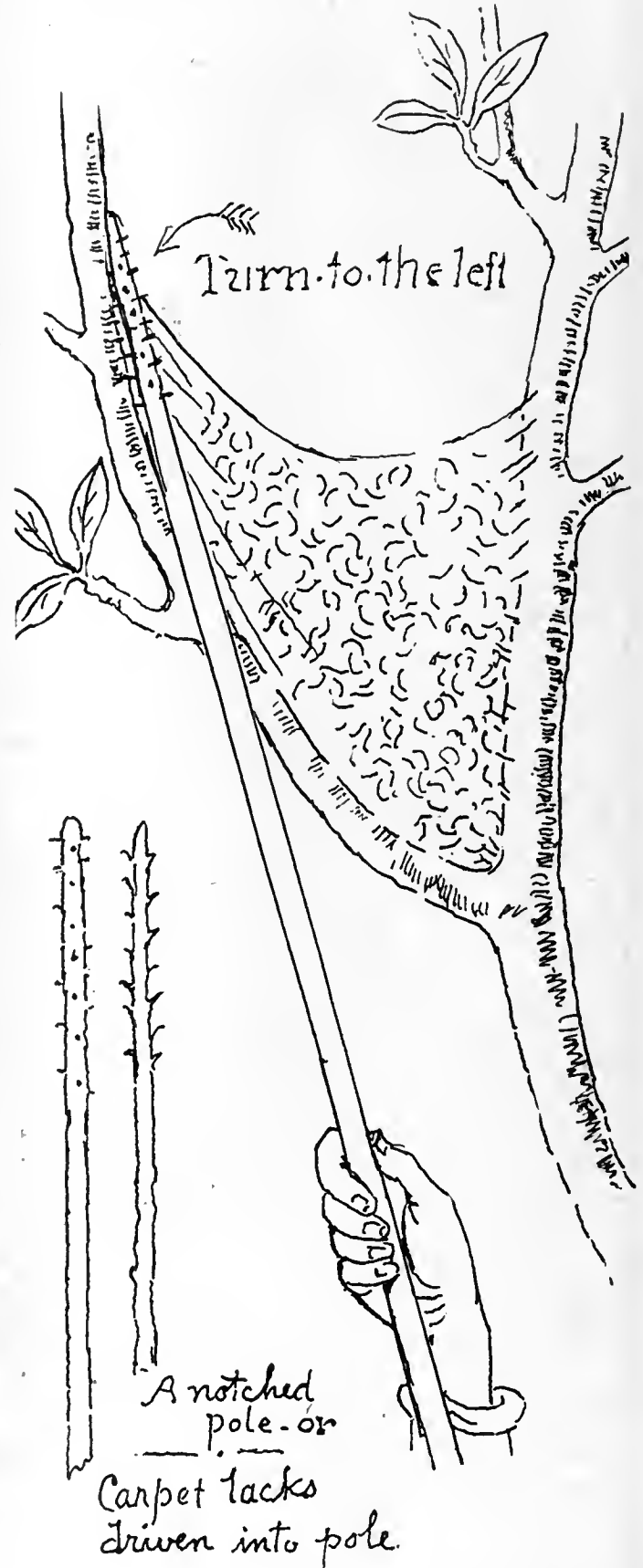
CATCH the web at its highest point. Turn your stick slowly allowing it to rest gently against the branch.

Keep turning your stick down to the crotch, then ascend the other branch to the limit of the web.

The entire web with every caterpillar imprisoned in the web, is on the end of your stick to be plunged into any liquid that will kill them.

Burning out nests frequently harms the bark.

By the method described, one can destroy three or four webs in the time it takes to burn one besides the trouble to renew rags is obviated.



THIS IS THE DEVICE

A rake handle, with carpet tacks driven in to protrude about a quarter of an inch, or, a natural stick notched by a pocket knife, as shown in the cuts.

PROTECTING BIRDS AS AN ACT OF PATRIOTISM

BY MOODY B. GATES

*"The birds—that make sweet music for us all
In our dark hours—as David did for Saul."*

IN THE general endeavor to win the war attention has not been centered so much on particular ways and means as on general results. Nevertheless many things have been done which will loom up large in the perspective and which it will take the restored normality of peace times to value at their full worth.

Prominent among these is the remarkable stride made within the past year in the direction of establishing bird sanctuaries throughout the nation. This development demands recognition, marking as it does a very forward step in a much needed direction and showing results which indicate that a firm foundation has been laid on which to build along similar lines.

Above other things, it indicates that under sufficient impetus our people are always ready to take up and push forward any humanitarian or conservation project of which the benefit is clearly pointed out by those having no selfish aims or ambitions to serve and who take up reforms simply for the general good. This work in no way conflicts with the splendid achievements of the Audubon

and other societies interested in bird preservation. On the contrary it supplements and makes effective the educational work which the other organizations have done and

are doing. In the case of the remarkable record herein described it is apparent that wonderful results are to be obtained by simple, direct, educative appeal. This showing of one million acres of land voluntarily pledged for bird sanctuaries and distributed throughout the entire country and over the boundary line in Canada is a tribute to the power of editorial influence, not only in bringing about tangible results, but in paving the way to giving legislation its maximum effect. In the space of only a few months, more concrete results in establishing private bird sanctuaries have been attained, than ever before in a like period of time. One can readily imagine the results if all national publications were to join hands in this or in a similar constructive work for Wild Life Conservation, Forestry, or anything else of public benefit.

When the United States entered the war and the question of food for our soldiers and those of our Allies became of paramount importance, *The People's Home Journal* began a campaign of education among its readers; first, to teach the value of birds as protectors of growing

crops, and, second, to put this knowledge to practical war work account by appealing to patriotic impulse. The necessity was pointed out of saving the birds from wanton attacks and encouraging their increase by affording them protection from hunters and guarding them as much as possible from their natural enemies as well as from extremes of weather. Volunteers were called for, to pledge their land holdings as safe nesting places and to furnish a supply of food for winter birds which perish in multitudes in time of severe sleet and ice storms.

To make the effort systematic and effective, the establishment in every district of a great number of bird sanctuaries was urged. Owners of farms and wooded tracts were asked to sign pledges that they would forbid hunting on their property and would conspicuously display the sanctuary notices furnished to every signer of the pledge. This campaign has resulted, up to October 1 of last year (1918) in 3,379 separate tracts of land having been voluntarily set aside and posted as sanctuaries for birds, and the land thus dedicated comprising a total of 933,975 acres scattered through forty-two states and Canada. The signing of pledges still continues and the total



Photograph by Brown Brothers

THREE VARIETIES OF THRUSHES

None but thoughtless youngsters would shoot beautiful warblers like these or desecrate their homes, yet thousands of nests are robbed every year.

acreage is steadily growing. The appeal to adults was further supplemented through "The Green Meadow Club," a department edited by Thornton Burgess to interest younger readers in nature study and the protection of wild birds and animals. A special appeal was made to the members of the club, through this department, to devote their energies through the summer to obtaining pledges for bird sanctuaries. Juvenile readers were shown that in furthering this important work they were performing a war service no less than were their older brothers in France.

That the youngsters took up the work in this spirit was shown by hundreds of enthusiastic letters. A Wisconsin boy wrote that he had taken the place in the field of an older brother who was in khaki, and in addition was devoting all his leisure hours to urging neighboring farmers to sign sanctuary pledges. A school girl from the same State who lived in a thinly settled district, walked and rode many miles daily, visiting distant farms, till she had secured pledges for an even hundred tracts and

tacked up the sanctuary signs. This record was even exceeded by another girl on a Montana homestead who, after covering her own district on horseback, persuaded her father to take her in the motor to far distant sections. Her efforts resulted in more than fifty thousand acres being pledged as sanctuaries.

In urging the establishment of sanctuaries, the aesthetic value of birds was not ignored nor the pleasure to be derived from the beauty of their plumage and the charm of their song; but the big emphasis was placed on the practical and patriotic argument that the protection of birds was part of the universal effort to win the war, and that the protection of birds meant bigger and better crops and more food.

It was shown that but for the efforts of birds, insects and weeds would in time make the profitable growing of garden crops an impossibility. Figures compiled by government investigators were quoted to show the enormous numbers of weed seeds and insects eaten by the quail, robin, bluebird, flicker, nighthawk, meadowlark, and all the more common birds of the American fields and woods. The fact was emphasized that such birds as owls, hawks and crows, which ordinarily have an evil reputation, largely because they are songless and plain of plumage, are indispensable as destroyers of field mice and other pests that destroy and damage millions of dollars worth of food annually, the total destruction of farm products in a single year having been estimated at nearly a billion dollars.

The results achieved from the start and the enthusiastic response were so notable that the attention of Mr. Herbert Hoover was attracted. In a letter to *The Journal*, commending its work, he said: "I hope the people of the United States will be made to realize how closely related to this whole question of food-saving is the protection and encouragement of insectivorous and migratory birds."

Dr. William T. Hornaday, head of the New York Zoological Park and managing director of the Permanent Wild Life Protection Fund, an organization for the protection of the nation's wild life, thought so highly of this sanctuary movement that he caused the fund to offer its exceptional gold medal as an added incentive for the workers. At the end of the 1918 campaign, Dr. Hornaday was so greatly impressed by the marvelous results achieved that he recommended

that the Permanent Wild Life Protection Fund award four gold medals instead of one, thus signaling the importance of the results achieved. The encouraging aspect of the situation in its broader outlook is that the sanctuary plan, while it won the enthusiastic support of the youngsters from the start, received its most effective support from thoughtful men and women who recognized it as an opportunity to establish bird conservation as a permanent popular movement of which future generations could feel proud.

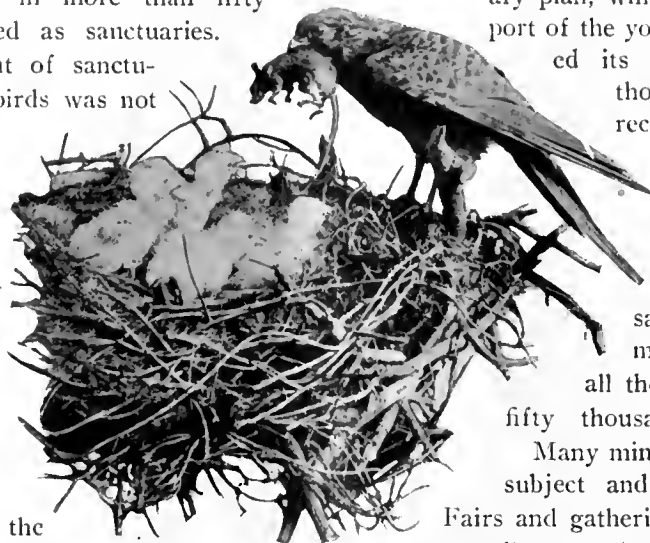
Among the thousands of sanctuaries obtained, there were many of one acre, and they ran all the way from that up to one of fifty thousand acres in New Mexico.

Many ministers preached sermons on the subject and delivered speeches at State Fairs and gatherings of farmers. One minister actually spent \$147 of his own money to secure pledges and succeeded in signing up 65,268 acres in seven counties in West Virginia. Another minister in Pennsylvania signed up 72,932 acres as a result of his personal enthusiasm. Each of these clergymen was awarded a gold medal by

the Permanent Wild Life Protection Fund. In the heart of a big game country, Saskatchewan, Canada, a game guardian was inspired to take up the sanctuary work and succeeded in securing 37,745 acres posted for bird protection under no small difficulties.

The whole campaign has shown that the work was made far reaching and effective as a result of appealing strongly to the popular mind through the columns of a magazine. Many schools in the various States took up the work and in this way the movement was given an impetus which will not be allowed to die through neglect, now that it has had such a favorable start.

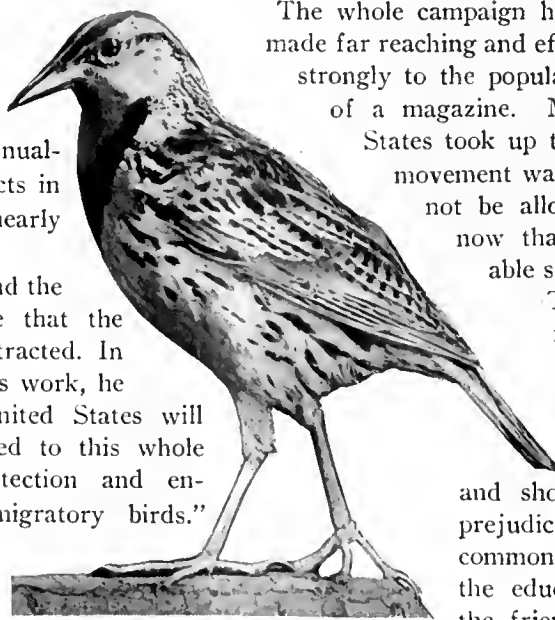
The sanctuary workers often found their task far from easy. First there was to be overcome the well established belief among farmers that birds destroy crops and should be exterminated. This prejudice, while not at present so common as a few years ago, thanks to the educational work carried on by the friends of birds, is still strongly enough entrenched to cause much resistance. An even greater handicap was the objection of hunters to giving up their sport. Many property owners were ready enough to bar other hunters from their property but wanted to reserve the right to hunt on their own preserves. Any property owner who insisted on this right was not accepted as a sanctuary signer.



Photograph by Henry Hill

THE SPARROW HAWK

One of the most useful of birds. It destroys large quantities of field mice as well as a great variety of the larger insect pests but is a showing mark for the man with a gun.



Photograph by Brown Brothers

THE MEADOWLARK

It devours vast quantities of the white grubs which attack the roots of growing crops. Forty-seven cotton ball weevils were found in the stomach of one lark.

In view of the world shortage of food, this bird sanctuary campaign will be urged more strongly than ever the coming summer. Already the subject of bird sanctuaries is no longer new in millions of homes and the way has been well paved for further propaganda along this or other educative lines for the conservation of wild life in its various forms. The bird sanctuary movement will be kept up and carried on with zeal and enthusiasm until the whole country is thoroughly converted to the necessity of bird protection.

The whole campaign has been conducted along broad lines. The right of the sportsman to enjoy his favorite recreation wherever game is sufficiently plentiful to allow of pursuit, governed by the ethics of true sportsmanship, is fully recognized. There has been no desire to antagonize the true sportsmen, but rather an effort has been made to enlist their co-operation. Thus when a land owner has refused to make his property a sanctuary unless shooting thereon was to be permitted during the open season, that land owner's attitude has been respected and effort has been concentrated on others in that vicinity who have no such objections.

The whole theory underlying the campaign is the need of individual farms or areas of land adapted to bird life, scattered through every district, made into sanctuaries as breeding grounds for game as well as for the strictly insectivorous birds. It has been pointed out



Photograph by Brown Brothers

THE CATBIRD

Ants, beetles, caterpillars and grasshoppers constitute three-fourths of its food. Its vegetable diet is obtained from the berries of wild vines. Poison ivy and sumach are a part of its diet.

to sportsmen that such sanctuaries will, in years to come, mean more and better sport. The overflow from these sanctuaries is bound to stock the remainder of the country.

While there have been some very large sanctuaries established, notably one of 50,000 acres, stress has been laid on the value of the small sanctuary of only a few acres and the advantage of securing as many of these as possible. A large number of small sanctuaries is of greater value than one or two very large sanctuaries because of the greater number of people immediately interested. Ten sanctuaries of five acres each means the immediate personal interest in the movement of ten families, against the interest of only one family in the case of a single sanctuary of fifty acres; thus an effort has been and is being made not only to secure as large an acreage as possible but to interest in the work as great a number of people as possible.

Taking it altogether the lesson to be learned from this preliminary crusade for nation-wide bird sanctuaries is that the people of our country can be depended on to respond liberally and enthusiastically to any practical conservation movement or constructive reform affecting the general good when the object is made sufficiently clear to them. Continued educational work such as has been done in this instance should be taken up by our national magazines and extended so that other national interests, which need only intelligent direction, may be crystallized into permanent constructive action.



Photograph by Brown Brothers

THE CUCKOO

Much given to eating the large hairy caterpillars which live in colonies and are most destructive to leaves of trees and plants.

MAJOR D. T. MASON, recently returned from military service abroad, is doing special work in the Treasury Department, at Washington. The Bureau of Internal Revenue, finding difficulty in administering the Income and Excess Profits Tax law with regard to the so-called "Wasting Industries," has turned to men

familiar with forest industries, as many of operations involved include mining, gas, oil and those dependent upon the forests for their raw material, and Major Mason, with the title of "Forest Valuation Expert," has been placed in charge of the organization of this work.

WALKS IN THE WOODS

(III) WITH WASHINGTON IRVING ALONG THE CROTON AQUEDUCT

BY J. OTIS SWIFT, AUTHOR OF "WOODLAND MAGIC"

(PHOTOGRAPHS BY THE AUTHOR)

THE warming sun entices us forth this spring morning for a walk along the top of the Old Croton Aqueduct from Hastings-on-Hudson to Tarrytown. The Aqueduct was built many years ago to supply New York City with drinking water. It has long since become an integral part of the landscape. It skirts the

of the path one may look, these spring evenings, straight down the river past the Palisades, and see the myriad twinkling lights of Manhattan, it is for the most part a secluded country lane, fenced, and dashed here and there with weirdly fantastic and lovely scenery.

We go down through the garden here at the Manor in Hastings, past the big white oak guarding the upper end of the little ravine where the Americans lay in ambush to surprise the Hessians at the Battle of Edgar's Lane, in the Revolution. We come out on the Aqueduct at "Locustwood," the old Minturn estate, now the home of Major Frederick G. Zinsser, where tradition says that Louis Napoleon was once a guest and where Admiral Farragut, who lived on the other side of the village at a later date, was often a visitor.

The fine colonial mansion, back from Broadway, is bowered among mammoth horsechestnuts that are glorious in blossom; white pines that may have souged above the heads of Colonial troopers; two beautiful old English lindens brought over and planted here by the early Minturns; one of the most



LOOKING UP THE AQUEDUCT
NEAR THE GOULD ESTATE

eastern bank of the Hudson for many miles, paralleling Broadway, the ancient post road that stretches from the Battery in the city to the Capital at Albany.

It meanders through the most historic region near the metropolis, and for eight miles through what are perhaps the richest private estates in America. It is a level stretch of grassy banks bordered most of the way with giant old forest trees. It is the easy path of communication between sleepy villages of the Hudson Valley; the Lovers' Lane where Darby and Joan saunter hand in hand on summer evenings, with none to see save the sympathetic moon. It winds through a country made famous by Henry Hudson, Washington Irving, George Washington, Rochambeau, and incidentally by Major Andre, the British spy. Though from picturesque turns



WASHINGTON'S HEADQUARTERS, AT DOBBS FERRY, WHERE HE PLANNED THE YORK-TOWN CAMPAIGN

imposing copper beeches in all the Washington Irving country; locusts from which the old place gets its name, and many other interesting trees.

A sanctuary of trees, shrubs, and wild birds, are the private estates along the Hudson. The patient hands that planted these whispering giants are dust, but the blessings bestowed by them go on from generation to



TULIPS AND SYCAMORES BESIDE THE AQUEDUCT

generation. Just before we reach Dobbs Ferry where Richard Harding Davis' hero "Captain Macklin" lived, and where is the tree-embowered home of the late Robert Ingersoll, we come upon one of the many "Washington's Headquarters" in this locality. This beautiful old manse here in the edge of Dobbs Ferry attracts us at once because of the fine spreading English walnuts, monarch horsechestnuts and big elms shading the lawn and flower garden. Comfortably dozing away the years it sits beside Broadway brooding over the Tappan Zee glistening in the spring sunshine to the west. Mr.

Messmore Kendall in recent years purchased this one-time home of Peter Van Brugh Livingstone, of a famous colonial family, and restored it as a patriotic duty and as a home for himself. Here Washington planned the Yorktown campaign. Some of the walnut trees were planted, it is said, by Washington while he used this house as headquarters. One of the walnuts is directly in front of the house, shading Broadway; one at the south entrance to the grounds, and two back of the house near the Aqueduct and the little buildings that were the slave quarters. There are Norway spruces, black cherry, oak,—and an ancient wisteria clammers over the porches about the doors and windows, with their beautifully hand-forged iron hinges and fixtures. One wonders at the craftsmanship of the blacksmiths and locksmiths who forged the doorlatches and locks of these old homes. What has become of the craft? Rest assured that the character hammered out on their anvils has come down the centuries making safe the government they helped to establish. Just beyond Dobbs Ferry where stood the

Indian village of Weckquaskeek at the mouth of the rivulet called Wyaquaqua, the Aqueduct embankment, winding regardless of village topography, crosses a deep ravine wherein is a happy little brook laughing down from the ridge of hills to the east, tinkling its way through the park of the country home of Edwin Gould. The big house sits on the bank above the river to the west of the Aqueduct, and its winding drive from Broadway follows the north edge of the dell. The ravine itself is a bit of natural woodland in the heart of extensive parkage. It is locally historic, for from the point where the brook slips into the shining Hudson not far from where the shell heaps of the aboriginal village of Weckquaskeek, up through the heavily forested gully, used to wind the trail of the Mohican Indians who passed this way from their canoe landing on their return from the summer hunting grounds up-State to their winter village in the Nepperhan Valley.

As we look down into the ravine through the tops of giant old tulips and white, ivory sycamores, we can picture the dusky tribesmen

pausing beside a great boulder dropped from the bottom of some grinding glacier. We see the shadowy warriors lounging about, smoking their long pipes while the black-eyed, red-bronze checked squaws made a fire with sticks and expose to the heat such trout and salmon as these enthralled brooks have not known for nearly three centuries.

There is a picturesque mystery about these bits of forest hidden among millionaire estates on the Hud-

son, that reminds us of the legends of Sleepy Hollow, and those older and more intimate tales told by imaginative



"LOCUSTWOOD," AT HASTINGS-ON-HUDSON



A BOULDER DROPPED FROM THE BOTTOM OF SOME GLACIER, IN RAVINE ON EDWIN GOULD'S ESTATE

nurse maids, of queer Little People,—fays, naiads, wood-gnomes, who come out of their fern-hidden grottoes on moonlighted nights to play pranks with the sleepy gardeners and ride the backs of flying squirrels among the shadow-haunted, limb-crossed sky spaces in the tree tops. It is hard to believe that all this lovely wilderness of brake, azalea, wild roses, ferns, mossy banks and hidden dells isn't inhabited by some tribe of Little People who stole their passage over in the cargo of the Half Moon, and now keep the rotting stumps decorated with bright-hued fungi and the gray stones painted with lichens.

Sit down on the sloping bank of the Aqueduct by the brook any moonlit summer night and up from the tangle of blackberries, Benjaminbush, and black cap raspberries in the ravine will come the music of orchestras of cicadas and crickets, playing wild unearthly little tunes for the nymphs of the brookside to dance to. And if you look close enough, down by the flat rock where the smooth black water pours over like melted glass, you will see—but perhaps the smoke and dust of houses has dulled your eyes, and you will not see anything! So what's the use?

As we go up the Aqueduct white-bibbed Peabody birds entice us to inspect the hedgerows and trees, and a yellow-hammer calls off somewhere down by the river. The

next place in this neighborhood where Washington is said to have made a more or less protracted stay is the old Schuyler estate, now the International Garden Club's country house. If you ride up Broadway from New York you'll be attracted about here by a won-



THE AQUEDUCT, CROSSING SUNNYSIDE LANE

derful row of great old sycamores lining one side of the roadway, some of them nearly three feet thick at the base, reaching up their gnarled, mottled brown, green, gray and white trunks to massive ivory arms leaning over the sidewalk. The estate was one of the properties of the family of General Philip John Schuyler, the father-in-law of Alexander Hamilton. The imposing great house down beyond the Aqueduct is surrounded by lawns dotted with weeping-willows, English walnuts, white pines, sycamores, locusts, horsechestnuts and a few magnolias. On a lawn just beyond Irvington-on-Hudson we come upon a Maidenhair tree, *Salisburia adiantifolia*, the Ginko tree of Japan and China, which is to be seen on many of the streets of Washington.

The tree folk that most impress us on our walk, though, are the sycamores, everywhere standing out in

the landscape because of the snowy whiteness of the massive arms, these early spring days, that they stretch up to the skies as if to welcome their lover, the South wind. These Occidental plane trees are the cousins of the Oriental plane trees of Turkey and Greece, under which the ancient philosophers used to gather their students about them. There are beautiful specimens of the Oriental plane tree on the Thames Embankment in London and on Riverside Drive in New York, though the latter are young.

On the bank of the Aqueduct just before we come to Sunnyside Lane, above Irvington, a shaded and shrub-bordered roadway running down from Broadway to the rambling old home of Washington Irving at the river we detect a faint fragrance beside the path. Stooping we find the grass roots closely interwoven with wild thyme—and our hearts sing with Shakespeare:



LOOKING DOWN SUNNYSIDE LANE TOWARD IRVING'S OLD HOME

"I know a bank where the wild thyme blows, Where oxlips and the nodding violets grow, Quite overcanopied with luscious woodbine, With sweet muskroses and witheglantine. There sleep Titania sometimes of the night, Lulled in these flowers with dances and delight."

The big yellow poplars, shagbark hickories, black birches, and cherries of Sunnyside Lane are dotted here and there with bird houses—the spirit of Irving, who received Louis Napoleon as an exile at his cottage on the Hudson, and who loved wild birds and speculated about their habits, we may believe, fully as much as he did about the spring the old Dutch woman brought over from Holland in a churn, seeming still to linger about the place. There is a cheerful little brook that babbles down through the Irving estate from Broadway past a spring near the Aqueduct, and, there being no taste of butter-milk, we stop to drink. Then we keep on up the path and come, just below Tarrytown, to where the Aqueduct cuts straight across the lawns of "Lyndhurst," the magnificent and beautiful estate of Mrs. Helen Gould Shepard—soft velvety lawns these spring days, and a little later we are entering the picturesque village of Tarrytown where, on the hills above, is the home of John D. Rockefeller, and, to the north, Sleepy Hollow, the little valley made famous by Washington Irving.

PHYTOPHOTOGRAPHY--OR THE SCIENCE OF PHOTOGRAPHING FLOWERS

BY R. W. SHUFELDT, M. D., C. M. Z. S., ETC.

(PHOTOGRAPHS BY THE AUTHOR)

IN SECURING photographs of flowers, to obtain the very best results one should be expert at photography in that special line; and, what is equally important, one should employ in the work the very best materials available, including the various modern appliances for taking color into consideration. It is most essential that one should have a thorough understanding of ordinary photography, supplemented by a familiar knowledge of flowers and their habits of growth, in order to make a success of phytophotography.

There is no line of flower study—and there are many of them—in which the photographic camera cannot be used to the greatest advantage. This is especially true when we embrace the entire subject of general botany in the statement; for the photography of a tiny flower requires a very different kind of experience as compared with what is demanded in making photographs of trees, be the latter for artistic or for scientific purposes.

In such pursuits, we have in one field all that pertains to the science of micro-photography of flowers, in which we aim to pictorially illustrate the intimate structure of all the parts of trees and plants of every conceivable de-

scription. With this department I shall have nothing to do in the present article, nor will the question of the photography of trees be entered upon here; that is a subject which will be taken up later on as one having especial interest for the readers of AMERICAN FORESTRY. Studied in the gross, where the subjects admit of it, the camera may be used to depict the special parts of a very large number of species of plants, and the aim is to exhibit the comparative form of the seeds, the roots, stems, leaves, blossoms, and much besides; but this most important field will likewise be passed in the present connection.

Then we have the artistic photography of plants and flowers, including all departments of botany. A volume might easily be devoted to this branch of phytophotography, as the subject is as far-reaching as the range of plant-life itself. Floral designs, as we know, are used throughout the entire realm of art, in all of its branches, and the use of the camera here is of the greatest aid and importance.

Some half a dozen other well defined lines of photography, in their relation to botany, might be pointed out; but the one to be touched upon here is quite



FIG. 1—BLUE VIOLETS, NATURAL SIZE, TAKEN AS THEY GREW



FIG. 2—FIVE BLOODROOT PLANTS TAKEN *in situ*, GROWING AT THE BASE OF AN OAK TREE



SEVERAL PLANTS OF THE TINY WHITE VIOLETS

Fig. 3—Taken in the studio with indirect sunlight from one window and with reflected light from a white surface. Made-up surroundings, with a smooth surface of pine for background.

different from any of the ones named above, and it appeals particularly to those who spend much of their time in the field and forests of the country, to those who frequently have the inclination to photograph our wild flowers.

This work may be undertaken either indoors or in the open, and in the latter instance the flowers or plants to be photographed may be taken *in situ* or otherwise. When photographed in the studio, there are many points to be considered, any one of which, when disregarded, may lead to failure. For example, in the first place we are confronted with the problem of proper lighting; and in addition to this are matters of suitable backgrounds for different specimens, of correct posing, of maintaining the original freshness of the specimens,

and the securing of detail and related values. Almost every specimen demands different handling, and we can well imagine that the number of specimens is practically limitless. This likewise applies to the conditions under which one works with respect to surroundings—indoors or out, to equipment, to climate, to the part of the world one may be in, and so on. Seasons also play their part, as well as the time of day. Further, it is a very different matter to photograph flowers out-of-doors in a swamp in the torrid tropics, than it is to attempt the same thing in the case of plants growing in the barren grounds of some subpolar region, or within the entrance of some cave or cavern in any part of the world. What will be dealt with in this particular are some of the ordinary problems of phytophotography, such as we may be confronted with during the spring and summer months in the north temperate parts of the United States.

First we may consider one or two examples of out-of-door photography of flowers and the lessons they have for us. There are at least three things to be borne in mind, and one of these consists in the choice of subject; then the matters of background and lighting are to be taken into consideration. Turning to Figure 2, we have five average Bloodroot plants in a group; they were photographed precisely as they had grown, and without the slightest disturbance of their surroundings. These flowers are not as perfect as they are sometimes found to be, while their leaves—in the first stages of growth—are both interesting and instructive; so much for our choice of subject in this instance. Now, as bloodroots are, in a very large number of cases, found growing at the base of some big tree, the picture in this particular is practically perfect, as no finer background could be chosen than the rough, gray bark of the oak here shown. Had this photograph been made on a moderately gray day, the result would have been perfect in so far as the lighting is concerned; but it was obtained on a very bright spring morning, in the full glare of the sun, and as a consequence nearly all detail of the delicate struc-



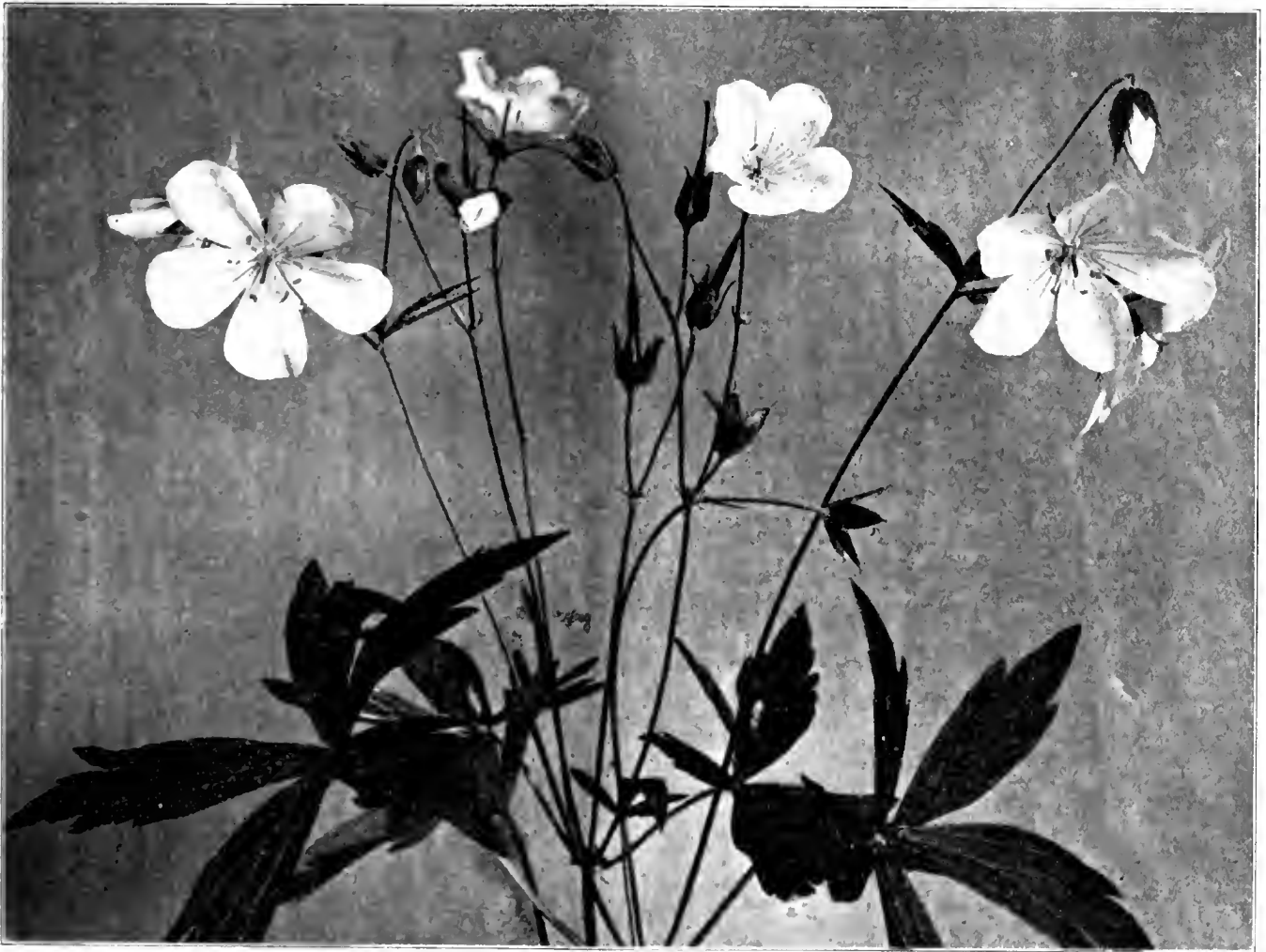
WILD GERANIUM OR CRANE'S-BILL PLANTS, BUDDING AND IN FULL FLOWER

Fig. 4—Taken *in situ*. Left side in semi-sunlight, right moderately shaded. Background of woods beyond. Small stop and several seconds exposure. Reduced one-third.

ture making up the central portion of each flower is entirely lost. This defect could have been easily overcome by someone holding a large, open umbrella at the right distance above the plants, so as to produce the proper amount of shadow for them; this may be done either by the operator or his assistant. If the former does it, he should have a least eight or ten feet of tubing to his shutter, in that he may stand in a place where the requisite shadow can be thrown, not only to include the plants but for a considerable distance about them.

On "gray days" no such procedure is necessary; but when photographing wild flowers in the open on such occasions, especial attention must be paid to the selec-

leaves of the plant almost entirely form the background, cutting out what is always a *most objectionable feature* in pictures of this class, namely all the vegetation in the background, which is conspicuously out of focus, notwithstanding your having used the smallest stop in your diaphragm. In this picture, where the leaves do not cut out this defect, the wonderfully deep shadows do, and this was anticipated through the precautionary study of the subject on the ground-glass. This result was obtained on a 5x8 rapid plate, with the plant natural size. A gray sky at noon tempered the light much better than an open umbrella could do, for the reason that the produced shadow or shading was general; whereas,



AN UNUSUALLY FINE WILD GERANIUM PLANT OR CRANE'S-BILL

Fig. 5—This was photographed natural size indoors with proper sunlighting. Background of smooth pine surface—buffy yellow. Flowers pale purple. Detail of minute structure perfect. With ordinary lens pollen grains may be seen on anthers.

tion of subject and background. A few years ago, when collecting examples to illustrate the present article, a big bed of the common, blue violet was selected for the purpose. After some ten or more studies on the ground-glass of my 5x8 camera, one was finally chosen, and a reproduction of a photograph made from the negative obtained is here shown in Figure 1. These flowers are of a rich violet color; but the thing to notice is that every delicate part of the structure of any of the three of them is reproduced in the minutest detail. In addition, the

in the case of an umbrella-shadow, it is deepest at the center and grows weaker toward the periphery.

Sometimes you will come across the very subject you've been looking for all day after a hard tramp, with three or four miles ahead of you before you can reach home, and just as the sun is barely above the horizon; but there is no use of thinking about photographing the tid-bit. Only one alternative is left you, and that is to take them along with you. Suppose, for example, that the specimen or specimens be a group of the most ex-

quisite little white violets; the way to do is to take them up, roots and all, in the most careful manner, and transport them to the house in some carrier in which they will not be disturbed in the slightest degree. When proper precautions are taken, this is by no means a difficult feat; and when carefully planted over night in some suitable receptacle, they will be in excellent condition for photographing the following forenoon. Now comes the task which calls for all your skill; but knowledge of lighting, natural posing, the background, and the accessories are all so well exemplified in Figure 3, that to write the matter out in detail would only needlessly consume valuable space. This result was also made the size of nature on the plate; and it is interesting to note how

suitable specimen close to your home, however, and by photographing it under the proper conditions of light and background in your studio, such a result as is shown in Figure 6 may be secured. This was made with an instantaneous six and a half by eight and a half dry plate, the subject being natural size. With a good hand-lens the most minute structures of the buds and blossoms can readily be made out—in fact, they are quite visible to the naked eye.

There is another way, however, in which such a picture as this may be made by one skilled in such procedures. It requires a perfectly clear day, absolutely no wind, and a cloudless sky. By getting up on some desired elevation—such as a hill or a house-top—where



HIGH-VINE BLACKBERRY IN FULL BUD AND FLOWER

Fig. 6—Natural size; indoors. Room highly lit by sunlight as in Figure 7. Background, smooth pine board (buffy yellow). Great detail secured throughout entire photograph. Graceful arrangement. In Figure 7 and in this one, the sun does not shine directly on the plants.

distinctly one may discern the fine, white pubescence on the leaf and flower stems. The structure-detail of the flowers is likewise most perfect, and bears examination, in the photograph, with a powerful hand-lens.

Quite frequently we will meet with some plant bearing delicate flowers, from which the petals are easily shaken, and of which we desire a natural size picture, showing all the characters of the leaves, stems, and the structure of the blossoms. Such a plant is seen in the "high-vine blackberry;" and to photograph it *in situ* without introducing an objectionable, distracting background all out of focus, is practically out of the question. By obtaining a

there are no objects between your lens and the sky, the blackberry branch may be secured in some fashion so that the sky forms the necessary background, and you can focus on the desired portion of the specimen, natural size. The subject should be properly shadowed by the use of an open umbrella held above it. Considerable skill and judgment is demanded on the part of the operator in order to obtain perfect photographs in this fashion; still, it can be done, and the results, if perfect, will repay one for all the trouble they occasioned.

One of the most difficult plants to handle or to get good, natural size photographs of is the well-known wild



GIANT CHICKWEED PLANTS

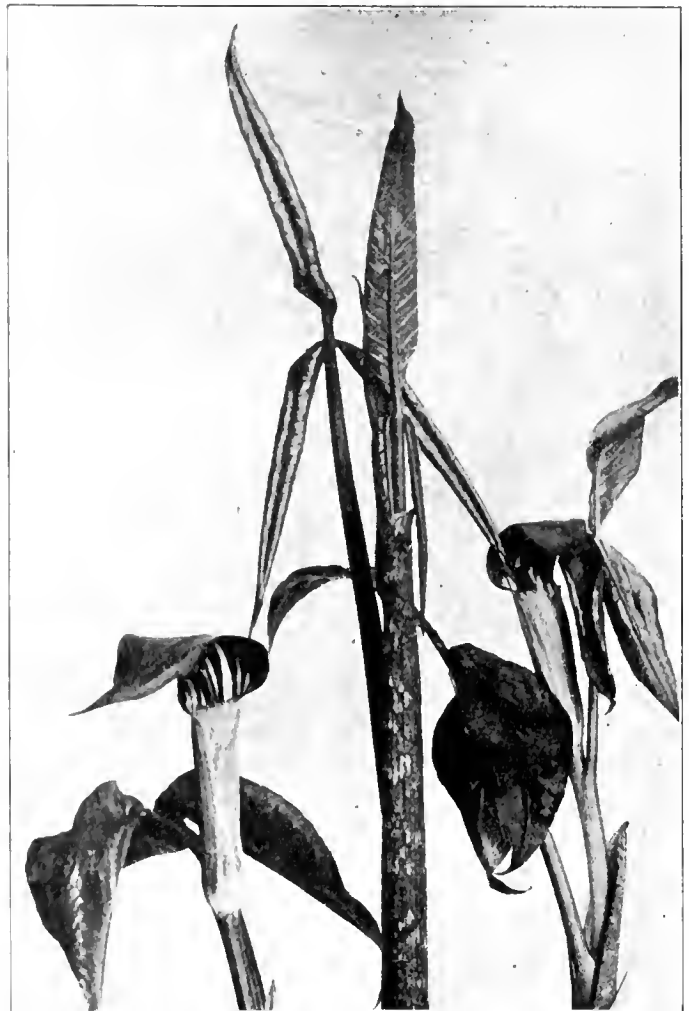
Fig. 7—Taken *in situ*, natural size, during a sunny forenoon. No shading employed. Detail of most of the flowers lost. Background not attractive. Time, a few seconds with small stop. While it shows how the plants grow in nature, the general effect only is somewhat pleasing.

geranium or crane's-bill (Figs. 4 and 5). In the first place they wilt almost instantly upon being plucked. If taken up by the roots they last a little longer, though generally not long enough to have you reach home. Even under the most favorable conditions the plant commences to droop in the most aggravating way in about ten minutes, and this casts out the plan set forth in the last paragraph with respect to the blackberry branch. This wild geranium rarely or never grows where nature's background can be obliterated. Some say, why not use a white sheet or a similar white surface back of it, just where it grows in the woods? For the reason that its purple flowers take *white*, and would not show in the result (Fig. 4). A color-screen would help some, but not to the fullest required extent. Observe, too, in the case of this plant, what extremely flexible and delicate stems it possesses, and these likewise form a real menace to your success, should you attempt the photography of this species in the open, when the air is in motion even in the very slightest degree.

Now, having made up my mind not to be defeated in the matter of obtaining a perfect photograph of any small plant in existence, the same was secured of this troublesome geranium by selecting the most perfect specimen I could find in a piece of woods only a few hundred feet from my house. It was most expeditiously taken up, with a great quantity of earth about its tender roots. Placing the whole affair in a deep bucket having a little water in the bottom, and shading the plant with a newspaper, it landed in my studio in less than six minutes after it was taken up. A background was already arranged for it, and the camera was in complete readiness to make an instant exposure on a six and a half by eight and a half

rapid, dry plate. This was promptly done, and in Figure 5 we have the satisfactory result; with a lens we may observe even the fine pollen upon the minute anthers! With the exception of its roots, every structure of this plant, at this stage of its growth, is in evidence and capable of being studied.

Occasionally, the Giant Chickweed gives one trouble, as may be seen by studying the result shown in Figure 7. These plants were wonderfully beautiful as they appeared when focussed on the ground-glass; and failure seemed a thing not to be dreamed of. Yet, what do we have? Why, one of the very kind of pictures that the student of photophotography should ever aim to escape producing. Note that the central portions of nearly all the flowers are lacking in detail, and that there are no relieving shadows for the brilliantly white petals. This defect must be overcome, either by selecting a gray day for the trial, or by the use of the open umbrella, as described above. But then, the background is too dark and unattractive, making the contrast with the flowers altogether too strong. But ah! that's another matter. Giant Chickweed is by no means an uncommon plant in the districts where it is found; and the thing to have done here was to have selected a more promising subject



TWO SPECIMENS OF JACK-IN-THE-PULPIT

Fig. 8—Spathes, leaves and other parts; natural size; indoors, in full sunlight. White cardboard background. Result perfect.

in a more favorable locality. Experience will help a great deal in work of this class, but it must ever be seconded by the most indomitable patience on the part of the photographer, in order to attain anything like success. Mind, Figure 7 is not altogether lacking in value from the viewpoint of instruction, as it not only shows the form of the flowers and the number of the petals, but also the characters of the buds, the shape of the leaves, that these are placed *opposite* each other on black, branching stems; finally, as a plant, it generally grows in masses and probably in shady places,—which, by the way, is really the case.

In the phytographic field we often have to deal with a class of pictures—or produce them rather—that are of a severe scientific type. These need only have a background of the most immaculate white—an effect easily produced by the use of a large sheet of white cardboard, placed behind the subject at the time of photographing it, or what is still more effective, a big sheet of soft, white blotting paper. Two things should receive our careful attention in making pictures of this class: the choice of subject and the lighting during the time the exposure is being made. As such pictures are intended for the instruction of botanical students, the subject-plant chosen should exhibit as many of its characters as possible, and the specimens should be as nearly perfect as we can find them. In posing, these structures should all come squarely into view and be seen to the best possible advantage. A very perfect example of this class of phytography is reproduced in Figure 8. It is of a fine specimen of our common "Jack-in-the-pulpit," collected shortly after its appearance in the early spring. Needless to say, this result was secured indoors, and with strict observance of all directions set forth in the foregoing paragraphs. The stem-sheath is beautifully

shown, as are the young leaves just emerging from it. Two fully developed "spathes" are in the picture, and their common characters are well shown in the left-hand one, which is perfect in all its parts. On the right side the emergence of flowers and leaf-stems from the sheath is well shown; some of the larger leaves are also in evidence, and the form they take on is shown quite distinctly.

If such a picture as this were used in any work of descriptive botany, it should be supplemented by one or two others, or maybe three. In a previous issue, AMERICAN FORESTRY has already published the ones referred to, and they are sections of the spathe to show the internal structure; one to show examples of the extraordinary root this plant possesses and how it varies in different specimens of the plant, and, finally, the fully developed leaves, with a picture of the ripe fruit. Our common Skunk Cabbage was dealt with in a similar fashion in AMERICAN FORESTRY, as have quite a number of other representatives of our flora of the Middle Atlantic States.

Most of our handsomest and more or less exhaustive works upon botanical science—whether general in nature or devoted to restricted areas—employ the last class of illustrations here described, and for very obvious reasons. No good student of flowers is benefited by having the pictorial side of the works he is studying obscured by hazy, dark backgrounds; faulty posing and selection of subjects; obscurity due to the matters of lighting and backgrounds, or to any other class of defects.

This contribution will not have been written in vain should it induce those making photographic pictures of flowers with the view of publishing them to take heed of some of the pitfalls that occur along the highway to ultimate success in such pursuits, upon which it has been the aim of this article to throw a little helpful light.

AT a recent meeting of the Board of Regents of the University of Washington, the name of the College of Forestry was changed to College of Forestry and Lumbering. While the term forestry, when viewed in its broadest sense embraces lumbering, the work at the University of Washington has broadened out so as to cover practically every phase of the lumbering industry, and in this respect differs from practically all other forest schools.

In addition to the work ordinarily covered in the forestry curriculum, Washington offers opportunities for specialization in general forest products, logging engineering, and the business of lumbering, the latter including new courses in milling and marketing. Expansion along these lines was necessary to meet the needs of the industry in the Pacific Northwest. The courses in logging engineering and forest products have now become thoroughly established and won recognition in the industry to the extent that the demand for the graduates, particularly in logging engineering, has far exceeded the supply. It is expected that the same will be true in the course covering the business of lumbering as soon as this becomes well established.

A PROCLAMATION creating the Alabama National Forest has been signed by the President. About 10,500 acres of public lands, in Lawrence and Winston counties, in the northern part of the State, which had been withdrawn from entry, are included in the new National Forest. In addition the Government has purchased approximately 12,000 acres and has options on an additional 13,000 acres in the same locality. It is expected that, by further purchases, the Forest will eventually be enlarged to include about 150,000 acres.

ON APRIL 3 and 4, at the New National Museum at Washington, District of Columbia, was organized the American Society of Mammalogists. The policy of the society will be to devote its attention to the study of mammals in a broad way, including life histories, habits, evolution, palaeontology, relation to plants and animals, anatomy and various other phases. The society will publish the Journal of Mammalogy, in which popular as well as technical matter, will be presented.

PLANT A MEMORIAL TREE

FORESTRY AS A VOCATION

BY H. H. CHAPMAN

WITH the return of nearly two million young men from the trenches and the varied activities of military life in France, comes a heightened interest in forms of outdoor employment. The appeal of forestry as a vocation has always drawn a class of young Americans whose love of the woods and of the hardships of the trail is combined with a desire for public service for scientific achievement, and for clean, practical effort.

Probably no profession holds a greater lure for those who rebel against the confinement of indoor occupations and have a genuine love for the woods and mountains, yet no calling is so little understood in America today as this modern vocation of forestry.

Forestry is the art of maintaining forests for the benefit of mankind. It is, first and foremost, a *land* question, for forests are the product of forest soils. Since forests as such must occupy land to the exclusion of agricultural crops or of fruit trees, forestry is based on the proper segregation of lands into the two fundamental classes, agricultural lands and forest lands. The forester's vocation usually excludes agriculture, but he is frequently called on, in co-operation with agricultural and soil experts, to conduct these land classifications. For this reason, a knowledge of farming is of great value to the forester.

The status of the land once determined, the forester's object is so to manage these forest areas that the greatest possible sum or combination of benefits may accrue to the communities dependent on them. These benefits are threefold. First, may be mentioned the use of the forest for recreation. This use has the widest appeal to sentiment, and is invaluable for maintaining health of body and mind for our increasing population of city dwellers. Areas set aside *exclusively* for this use are known not as "forests" but as parks, and while the forester as such can perform invaluable services in protecting the forest from fire, insects, diseases, and other enemies, he cannot here bring into play the full exercise of his abilities, for this includes the cutting and utilization of timber which is usually prohibited on such areas. The care and preservation of game, a specialty in which the forester is profoundly interested, will find its fullest development on large park areas.

The second great benefit from forest areas is the protection they afford to our soils and water supplies. Perhaps this is the best-known and best-understood function of a forest cover. In maintaining the flow of springs, in preventing the erosion of surface and the silting up of rivers, in reducing floods and prolonging the flow of streams in dry periods, the maintenance of forest cover is essential. Here, again, the forester's function is the protection of existing forests. But both in parks and protection forests there is the frequent necessity of re-establishing by artificial means the forest cover on slopes denuded by fire or by destructive lumbering. In this

latter role the forester must be a tree planter and must get his results, not as the ornamental nurseryman does, by pampering the individual plant, but on a large scale, with small stock, at minimum expense, and in competition with such destructive forces of nature as drought, wind, insect pests, rodents, frost, snow, and grazing animals.

But the real art of the forester lies in the management of the forest for the continuous production of wood in all its forms. Wood must serve us in many capacities, such as for fuel, buildings, furniture, paper, vehicles, and so on in an ever-widening circle. It cannot do so unless trees are cut, logged, transported, manufactured, and laid in a finished form at the door of the consumer. The cutting down of mature forests is necessary to the comfort and well-being of the very individual who declaims against this destruction because of his sentimental regard for the forest in its natural state. The lumberman has built up an enormous business whose exclusive concern is to supply the economic demand for wood products by taking from the forest the raw product of nature, the mature tree, and converting it into lumber from which by other processes finished products are made. It is not the business of the lumberman, as such, to do more than this. And as long as the supply of virgin timber holds out in America, the lumberman will continue to draw upon it as if it were inexhaustible. His business *begins* with the felling of the tree; the forester's business, as such, sees its completion in the same process. Forestry precedes and underlies the lumbering of the future. The true business of the forester is to grow the timber which ultimately finds its way into the economic life of the nation. Just as one agricultural crop must be harvested before another is grown, so a mature crop of trees must be cut before a young, vigorous second growth can appear. The forester's art is so to cut this timber that the forest will reproduce the most valuable species. Only by accident does this result occur naturally, following the operations of modern logging, and it never happens more than once on the same site. The worthless brush and forest weeds which spring up so frequently on old cuttings have about as much resemblance to commercial forests as thistles have to wheat. They are both green in season! Not that the lumberman can not manage his lands as forests should be managed if he sets out to do so, but that he too often has no interest in the land itself except to get rid of it as soon as the mature timber is cut. He owns it in order to assure to his business an early supply of raw material, wood.

The forester, then, is one who manages forest land for the purpose of growing trees and maintaining the productivity of the soil and of the forest. Do lumbermen employ foresters? They have need of timber cruisers to estimate the volume of their merchantable timber, of logging engineers to lay out their railroads and logging

operations, of woods foremen to superintend the logging, and of inspectors to secure close utilization of the tree. There are many openings along these lines, as well as in the milling, manufacturing, and selling end of the business, but none of these is forestry, however *essential to forestry* these operations are. When the lumberman, as a *land owner*, adopts the policy of reproduction and growth of trees, and sets out to retain indefinitely the ownership of cutover land for the possible future revenue obtainable from such management, then the forester will find an opportunity to practice his true vocation as manager of such tracts. His education as a forester may fit him meanwhile for useful employment along these kindred lines. In other words, the character of land ownership and the purpose of the owners determine whether the work of the forester constitutes the practice of his vocation or of some other line associated with lumbering or manufacturing. The men who worked in the French forests with the forestry regiments can bear witness to the truth of this statement. For over there, about half of the forested areas are publicly owned, and on the rest, the private owners have practiced forestry for decades, even for centuries; otherwise there would be no French forests! Every acre of these forests, no matter how owned, has been produced directly by the art of the forester; and the French forests saved France as truly as did the American army.

In America, due directly to our superabundance of virgin timber, private owners, as a class, could not afford and did not care to undertake the expense of producing timber; the competition with virgin forests prevented it. So it has come about that *forestry*, and employment for foresters as such, has developed principally on the National forests under the United States Forest Service, which controls 155 million acres of public lands set aside for timber production. The Forest Service employs over 2,500 forest rangers and officials of higher grade. At present, the larger number of men is taken into the Service as rangers after their passing an examination to secure Civil Service rating. This examination is given annually, in the fall, and is based upon familiarity with certain essentials of the work of a ranger, such as compass surveying, handling small timber sales, the administration of grazing for forest users, fire fighting, trail or road building, packing supplies, and making out reports. Western experience counts for much, and before taking the examination it is customary for an applicant to seek a position as forest guard, fire lookout, or "temporary" ranger during the season preceding the examination. Applications for such employment may be made to the District Foresters at San Francisco, California; Portland, Oregon; Missoula, Montana; Ogden, Utah; Denver, Colorado, or Albuquerque, New Mexico. These positions pay a salary of \$1,100, increasing by promotion to a maximum of \$1,500. Many rangers have only a common-school education, but the opportunity for *advancement* beyond this grade is largely determined, first, by the amount of additional education possessed by the rangers, ranked in order as graduates of high school, college, or

technical school of forestry; second, by their character and ability to master the work, take responsibility, exercise initiative, and become good executives. The second method of entrance into the Forest Service is by passing a highly technical examination for the Civil Service grade of Forest Assistant. This requires a complete course of training at a technical school of forestry, equivalent to a 4-year college course with one year of post-graduate work. The Forest Assistant is frequently assigned to ranger work on entering the Service. The benefits of entering the Service as Forest Assistant lie largely in the educational training obtained previous to employment. Forest Assistants are also given work in research at Forest Experiment Stations, in timber-sale administration, timber estimating, grazing inspection, and general administrative work. If they show adaptability and character, they, as well as rangers, may become Forest Supervisors at salaries from \$1,800 to \$2,400, or eventually may obtain higher executive positions paying up to \$3,600 in the District Offices or at Washington.

Certain States, as New York and Pennsylvania, which own large areas of land set aside as State forests, employ foresters. Pennsylvania educates her own State foresters at the Forest Academy of Mont Alto. New York secures hers by Civil Service examination in technical forestry.

The employment of foresters by owners of private lands will steadily increase from now on as land owners begin to realize that non-agricultural land can be made to yield an income in no other way. Paper companies, with millions invested in plants, are apt to desire a permanent output from their spruce lands, and they employ foresters to secure this end. Mining companies in regions where the supply of virgin timber is nearing exhaustion are taking an interest in forestry and foresters. Railroad corporations, driven to produce tie timber locally, are employing foresters to attain this object. Owners of large estates composed of woodland, and institutions with forest lands are realizing the need of employing foresters properly to care for their properties.

A host of small land owners exists such as farmers or owners of small estates, who can and should practice forestry on woodlots and waste places. These tracts are not large enough to justify employing a trained forester. To supply the wants of these owners, States have established forestry departments for public education in forestry, as well as to secure fire protection on forest lands. This educational work gives employment to a few foresters who have special gifts for public work, or who are needed for forest "extension" work among land owners. In addition, forest rangers are employed to specialize on fire patrol and prevention.

Finally, come the forest schools, whose business is to train and educate the foresters. Schools exist for the training of forest rangers and foremen of forest estates, which usually give a one-year course, mostly in the practical work of a ranger, such as that of fire suppression, tree planting, marking timber for cutting, surveying, and of other lines. A still larger number of college schools of forestry have been established. The recognized stand-

ard for adequate professional training is a 5-year college course based on the sciences of botany, physics, mathematics, and political economy.

The work of a forester may begin in the solitude of the wilderness, with the survey, topographic map, and estimate of timber, but it comes back to contact with men. The purpose of forest management is to serve mankind, and in working out these problems of service not merely for next year but for decades to come, the forester acquires a breadth of vision and an insight into economic laws which make for the building of character. His profession demands of him a rugged physique and ability to endure hardship, yet lifts him out of the monotonous drudgery of manual labor. No calling makes such varied demands on the individual, or so stimulates all-around development. The forester, in order to rise to the top of his profession, must be able by close-observation to analyze the living forces of nature as expressed in the growth of trees and the survival of seedlings, and

must control these forces to secure the ends desired. This requires scientific bent of mind and training. He must have an intelligent appreciation of engineering problems which are often the key to the use of forest resources, and must be alive to the economic needs of communities, that he may shape the forest management to supply them. But he must also be a public leader, to secure co-operation in fire protection, create sentiment favorable to the establishment and continuance of forest policies, and secure beneficial legislation.

The foresters of America face a task which is only just begun. They have, however, shown themselves to be equal to their responsibilities, and to possess a knowledge of their common aims and ideals. Each member of this new profession strives to wrest from nature the control of her life-giving processes, and from man the recognition that foresight, conservation, and thrift must take the place of unrestrained exploitation of natural wealth in timber if our national prosperity is to continue.

FOREIGN NURSERY STOCK INSPECTION

THE main arguments of objectors to plant quarantine No. 37 are that either no pests are brought in on such imported stock or that thorough inspection abroad would eliminate any undesirable insects. There is no question but that the chief exporting foreign governments have given to their nursery stock the best inspection which human skill and science can afford. Failures are due to the human equation and to conditions not subject to change, which make inspection and certification insufficient safeguards.

The inadequacy of such inspection since 1912, when it became operative, is shown by the findings resulting from reinspection of imported material at destination in this country. Data gathered by the United States Department of Agriculture show that there have been received from Holland and Germany 3,161 infested shipments, involving 486 kinds of insect pests. Many of these intercepted insects are not known to be established anywhere in this country and numbers of them, if established, would undoubtedly become important farm, garden, or forest pests.

Under the system of inspection which has been established in the principal exporting countries there is little excuse for the passing and certification of stock infested with the egg masses of the gipsy moth or with the large and rather conspicuous leafy winter nests of the larvæ of the brown-tail moth. In point of fact, however, during the period in which the highest possible grade of inspection has been enforced, no less than 52 different shipments of plants from foreign countries have been found to be infested with egg masses of the gipsy moth or larval nests of the brown-tail moth. Three of these were from Japan and the others were from France, Holland, or Belgium.

Unfortunately, these records do not necessarily comprise the total entry of these two pests. They represent merely the instances of infestation discovered by rein-

spection on this side. There is, therefore, the possibility that one or both of these pests have already gained foothold at one point or another in the United States and have not yet been discovered and reported. In this connection, it should be remembered that the gipsy moth was 20 years in Massachusetts before it was known, and this in the face of the fact that the infestation started in a thickly populated suburb of Boston.

That foreign inspection gives no real security is sufficiently shown in this record relating to two insects for which there is little, if any, excuse for overlooking.

The establishment of these two insects in different parts of the United States would soon lead to their general spread throughout the country. What this would mean in cost and damage and also in human suffering can hardly be estimated. Only a portion of the New England States is now invaded by these insects, and yet the expenditure in clean-up and control work alone amounts to more than a million dollars a year by the States concerned, in addition to aiding Federal appropriation of upward of \$300,000 annually.

An important consideration in relation to the brown-tail moth is that in addition to the actual damage to deciduous forests, orchards and ornamental plantings, the larval hairs which are shed and fill the air at the time of the transformation of the insect to the chrysalis stage have an intensely irritating or nettling character, which causes a great deal of inflammation to the exposed parts of the human skin, such as the neck, face, and hands, and this irritation, in one or two known instances, and perhaps in others, has been the cause of death by affecting the lungs and leading to fatal cases of tuberculosis. Should the brown-tail moth reach the South and Southwest this irritation to human beings would doubtless be increased by reason of greater warmth and by the moisture of the skin and consequent greater likelihood of adherence of the larval hairs.

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT CANADIAN SOCIETY OF FOREST ENGINEERS

THE idea of reforestation to provide for the future wood supplies of large pulp and paper industries is spreading rapidly. The Laurentide Company, Ltd., and the Riordon Pulp and Paper Company, Ltd., will plant 750,000 and 900,000 spruce, respectively, besides some pine. Price Brothers, Ltd., are starting a nursery and will make a small plantation. The Canada Paper Company will plant on a small scale. The Belgo-Canadian Pulp and Paper Company, Ltd., and the Abitibi

meeting and this bids fair to be one of the most interesting and important meetings ever held to discuss lumbering and forestry. Logging methods, slash disposal, reforestation, the diameter limit regulation, fire protection and other subjects will be thoroughly discussed. The Laurentide Company has issued a cordial invitation to the members of the Section and their guests to visit its nurseries and plantations near Grad' Mere after the Berthier meeting. American lumbermen and foresters



His Majesty, King George, congratulates a Canadian lumberjack on his uncommon skill in felling a tree.

Pulp and Paper Company are preparing their plans for an extensive planting program. No word has been received from the Pejepscot Company, which was one of the pioneers in reforestation and which has been planting at intervals for some years. If the plantations of these important companies are successful the movement will spread rapidly and will be a great benefit to the industry placing it on a more permanent basis than ever before.

The Council of the Woodlands Section of the Pulp and Paper Association have decided to accept the invitation of Mr. G. C. Piche, Chief Forester of Quebec, to hold a conference the end of June at the Quebec Government Nursery at Berthier-ville, about 40 miles from Montreal. He has kindly consented to let the Section have the use of the commodious building for the

are heartily invited to attend and take part in the discussions.

The Berthier Nurseries have been in operation for a number of years and have supplied a large amount of planting stock and also ornamental and windbreak trees to farmers. The Government now proposes to increase the output as soon as possible to five million trees per annum. This will make this one of the largest nurseries in the country and will enable the Government to supply limit holders with trees and also to undertake planting on its own account.

Dr. J. S. Bates, since its inception the chief of the Dominion Government Forest Products Laboratories, at McGill University, Montreal, has resigned his position to direct a research department for Price

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Brothers Company, Ltd. This will be a great loss to the Laboratories, which have done excellent work under Dr. Bates. He also represented the Imperial Munitions Board at Shawanegan Falls where much excellent work was done during the war in the manufacture of acetone and many other important chemicals. The new field which he is entering, that of the profitable use of the by-products in the manufacture of sulphite pulp, is one which is rich in



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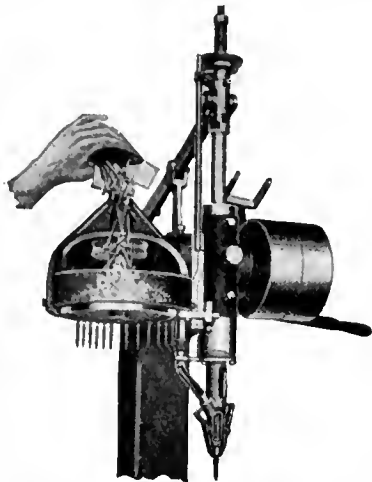
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possibilities for new products and for profits. There is also the question of the utilization of hardwood in the manufacture of paper which it is hoped will be taken up.

Don Ricardo Codorniu, who has been for many years in charge of reforestation, drifting sand work and prevention of flood damage by mountain torrents in Spain, has been elected an honorary member of the Canadian Society of Forest Engineers. He has been for a long time one of the moving spirits in *Los Amigos del Arbol*, the Spanish Forestry Association and is the editor of *Espana Forestal*, a very interesting and well gotten-up forestry journal. The illustrations in this paper are exceptionally good and the articles well worth reading. The order of Isabella the Catholic was bestowed on Senor Codorniu a few years ago by popular petition. Senor Codorniu is an enthusiastic Esperantist.

The British Columbia Forest Service will again use a hydroplane for forest patrol. The first attempt failed owing to an accident in which the pilot landed on the roof of a house and went through into the bedroom of one of the occupants.

Sometime during the coming summer the Dominion Forestry Branch will test out an aeroplane in the Province of Alberta. The machine will be specially altered to meet the requirements of fire protection work.

Prof. R. B. Miller, who has been in charge of the Forestry Department at the University of New Brunswick, is at Yale where he has been acting as lecturer in the Forest School on Forest Management. He is also taking special post-graduate work.

The Co-operative Fire Protective Associations in Quebec have purchased moving

picture machines and will carry on a campaign in the rural districts and those remote from the railways to educate the people in the need for fire protection and forest conservation. The educational program carried on by these associations has in the past done more than anything else to reduce the number of fires and the people are learning that they are partners and co-owners with the limit holders and have a large stake in the forests. In many parts of Quebec the farmers could not live if they were not able to work in the forests in winter.

Major A. R. Lawrence has come forward with a proposal to put forest ranging and game protection under a semi-military organization in Ontario, something along the lines of the famous Northwest Mounted Police. This might possibly be a success if it were as well handled as that celebrated organization, but something would have to be done to find work for the men in the winter and the cost might make the taxpayers think twice before adopting it.

The exports from Canada's forests, as shown by the bulletin of the Department of Trade and Commerce for the year ending November, 1918, were \$64,281,861, or an increase of 22 per cent over the previous year. This was double the amount of fishery exports and 85 per cent of that of minerals. In addition to these primary forest products wood-pulp amounting to \$32,580,619 was exported. The pulp and paper industry is the most important by far for the Province of Quebec.

The Abitibi Pulp and Paper Company has become one of the co-operators with the Commission of Conservation in the study of cut-over pulp wood lands. This research bids fair to be of the utmost importance for the determination of proper

silvicultural methods in the handling of these lands and is throwing much light on the subjects of reproduction and growth.

The necessity for an inventory of the forest resources of Canada is becoming more and more pressing. The results of the Commission of Conservation's work in British Columbia will be published shortly. Nova Scotia has been covered, an intensive survey of New Brunswick is under way, but Ontario and Quebec, next to British Columbia the most important forest provinces, still have very little knowledge of the extent or amount of their resources. A little work has been done by private owners, some of whom have made intensive surveys of sections 2,500 to 3,000 square miles in area. The only bases for estimating over large sections are the results of such surveys and some of a few hundred square miles made by the Provincial Forestry Services. The aeroplane offers such a rapid and easy method of reconnaissance for these huge areas, inaccessible in any other way, that work of this character must be undertaken very soon. The permanence of the lumber and paper industries is of vital importance for eastern Canada and the industries themselves are doing more than their share of the work to insure it.

The Laurentide Company, Ltd., which made a successful experiment in grinding hardwood for pulp last year is preparing to conduct experiments in barking both with knife and drum barkers. It has been said that hard wood barks in drum barkers easier than spruce. Experiments are also under way in regard to driving this wood by water. Should the experiments prove successful a means will have been found to lessen materially the drain on our waning soft wood supplies.

NEW BRUNSWICK FOREST SERVICE STAFF CONFERENCE

BY ELLWOOD WILSON

MANY of the Forest Rangers, Scalers, Game Wardens, and Fire Wardens of the outside staff of the Crown Land Department met in Fredericton on Wednesday and Thursday April 2 and 3. The Conference has been called by the Forestry Advisory Commission with a view to considering improvements in the methods of scaling, fire protection and game protection in the interests of efficiency.

The main part of the program called for a practical discussion by the Rangers themselves of many of the questions under consideration, although a number of outside speakers also addressed the Rangers.

GEORGIA TRAINING FORESTERS FOR THE WAR DEPARTMENT

DURING the war the forester, as much as the chemist and engineer has demonstrated his worth. In connec-

tion with the first Engineering Corps there was recruited a "Forestry Contingent," and, even before this, various New England states had sent over a number of forestry units to assist England in logging and manufacturing her forests. During the past year the War Department has been busy recruiting a Forestry Corps for duty in France. The fact is that this war was largely an engineering problem; hence the unparalleled demand for that greatest of all construction materials—wood. Transportation lines must have wood for ships, for cross-ties, for bridges, and for cars. Of what value would food and soldiers have been if we had not the means of transporting them to where they are needed?

The crowning achievement of the great war is the wonderful way in which the United States organized her resources towards the successful culmination of that project. With the approval of her people the Government took over the direction of railways, ships, munition factories, mines and whatever was needed in pushing the war. The State universities and colleges became great training camps in preparing men for technical projects under the War Department. In the Students' Army Training Corps men with the proper preparation were given an opportunity to secure military instruction while fitting themselves along some specialized line of endeavor. Courses of study were modified so as to eliminate all but the essentially practical; the emergency demanded intensive but thorough training. Instead of requiring four years to graduate an engineer, forester or chemist, the same result must be achieved in a half or a quarter of the time. No thought could be given to college credits; the object was to give the Government the efficient men it demanded and in the shortest time possible. It was with this thought in view that the two-year course in Forest Engineering was organized at the University of Georgia. The subject matter of the course was arranged with the approval of the Committee on Education and Special Training, War Department.

The specialized course in Forest Engineering covers a period of two years, although each year is largely independent of the other and each term of the other. This means that a man may enter at the beginning of any term and successfully pursue the work. The year is divided into four terms of twelve weeks each. The fourth term of each year is conducted in the woods on a logging or milling operation, where the men have an opportunity to become proficient in the handling of machines, instruments and tools.

The course covers a period of two years, the year consisting of four terms of twelve weeks each. Three terms of each year will be spent at the University; the fourth on some woods or milling operation. The understanding is that these students will be

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permitted to complete the period of training. For this reason the subject of forestry has been placed in the same category as the subjects of medicine, engineering and agriculture.

For further information address the Chancellor, University of Georgia, Athens, Georgia.

ARMY AIRCRAFT TO FIGHT FOREST FIRES

ARMY airplanes and captive balloons will cover portions of the National Forests of California, Arizona, New Mexico, and other States this summer, to aid in detecting and suppressing forest fires. In compliance with an order from Secretary Baker directing the Air Service to cooperate with the Forest Service of the United States Department of Agriculture in this work, conferences are under way to determine where, and to what extent the air scouts will supplement the forest rangers.

That there is a distinct and important place for aircraft in fire protection of timberlands is regarded by the forestry officials as beyond doubt, but experimental trial of methods and possibilities will have to be the first step. This is now being planned for the coming fire season. Army air-dromes and bases will be utilized for the experiments. Some of the bases near enough to National Forests to be used advantageously are the flying fields at San Diego, Riverside, and Arcadia in southern California. Other points in the West and in the East are under consideration, including one near the White Mountains in New Hampshire.

One of the interesting possibilities to be tested is bombing fires to put them out.

It is believed that bombs charged with suitable chemicals can be used with good results. Another plan to be tested is transporting fire-fighters by dirigibles from which ladders can be lowered to the ground.

The chief use of the aircraft this summer, however, will be for fire detection. At present the Forest Service relies for this partly on patrol, usually by men on horses, motorcycles, or railroad speeders, and partly on watchers stationed at lookout points. Aircraft have many points of obvious superiority for both classes of detection work.

Lookouts in a very broken country, cut up by deep canyons or where mountain ridges obstruct the view, or in a flat country that affords no good points of vantage, are often unable to pick up all fires quickly by the rising smoke, or to locate them accurately. For precise location the system in use depends on triangulation through reports telephoned from separate observation points. Airplanes would use wireless in reporting fires, as they have done in communicating with the artillery, and would locate fires by co-ordinates in the same way that gun fire in war is directed to a particular spot or object.

From the Army standpoint, the use of aircraft in protecting the National Forests affords a valuable opportunity for training flyers and developing further the possibilities of aircraft and the art of flying.

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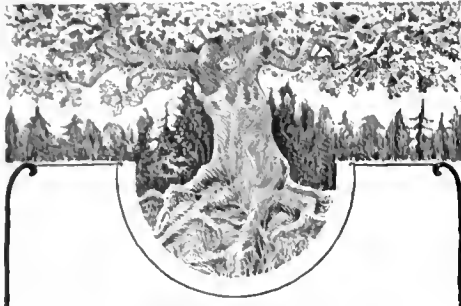
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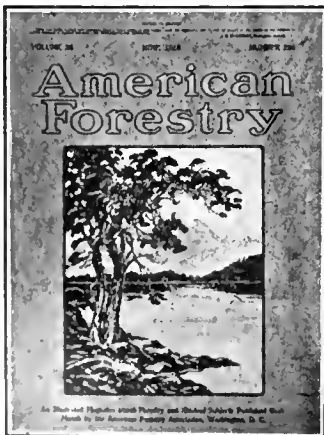
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JUNE 1919 VOL. 25

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U. S. M. P. O. 717
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ON November 25, 1917, the first board was cut in France by American Forestry Troops at a little French mill in the Jura Mountains. At the same time, another detachment was getting out 50-foot piling in the Landes on escort wagons drawn by hand. The total cut during December, 1917, was 321,000 board feet of lumber and 12,000 railroad ties.

When the armistice was signed on November 11, 1918, the 20th Engineers were operating 81 American Sawmills and producing 2,000,000 feet of lumber and round products every working day. Up to December 1, we have cut a total of 272,500,000 feet of lumber, including 2,728,000 railroad ties, together with 38,000 pieces of piling, 2,739,000 poles of all sizes and 892,000 steres of fuel-wood.

Recent reports from the various depots and construction projects of the A. E. F. show that the Army was at the time of concluding the armistice well supplied with lumber. When ties were called for in large quantities to support the advances of our troops at St. Mihiel and the Argonne, they were ready. At practically every dock project, deliveries of piling and lumber were well ahead of the construction. In other words, the Forestry Troops have made good on the work for which they were brought to France. Notwithstanding the difficulties in obtaining equipment and transportation, notwithstanding the enormous increase in the size of the A. E. F., and the work which it undertook over the original estimates, the Army has been given the lumber which it needed, and the suspension of hostilities finds us with a substantial surplus which will be used for the restoration of France. This is an achievement in

which every man in the Forestry Troops may well take pride, for every one of you have had a share in it. Your part in winning the war has been as important as that of any other troops in the A. E. F. Your loyalty and enthusiasm have been put to a hard test. You wanted to get to the front, but could not. You have had to put in long hours of the hardest kind of work, month after month, without glory or excitement, and without the

special forms of recognition given to combat troops. The Medical Officers have told us that the Forestry Troops were being worked too hard, but the only answer has been a steadily increasing cut of lumber from month to month. You have failed in no task that has been assigned to you. You have gotten more out of sawmills than had ever been dreamed of by mill operators at home. Time and again, in spite of difficulties such as lumbermen never contended with before, you have exceeded our expectations. Your record as members of the A. E. F. will be a source of pride and satisfaction to you as you return to civil life. It will be your recompense for the sacrifices which many of you have made to come to France.

As Commanding officer of the 20th Engineers, I thank you for the untiring and uncomplaining way in which you have done your work. I am glad to have been identified with such a body of American soldiers.

A copy of this order will be sent to every company and detachment of the 20th Engineers, and attached service troops; read to the troops, and posted on the Company or Detachment bulletin board.

J. A. WOODRUFF,
Colonel, Engineers.



COL. JAMES A. WOODRUFF
Commanding 20th Engineers (Forestry)

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THE AMERICAN LUMBERJACK IN FRANCE

BY LIEUT.-COL. W. B. GREELEY, 20TH ENGINEERS

NOTHING illustrates the far-reaching economic demands of the Great War more sharply than the enormous use of timber in almost every phase of military operations. From the plank roads at the front, the bomb proofs, the wire entanglements, and the ties needed for the rapid repair or construction of railroads upon which military strategy largely depended, to the hospitals, warehouses, camps, and docks at the base ports, timber was in constant demand as a munition of war. One of the earliest requests for help from the United States by both our French and British allies was for regiments of trained lumbermen. General Pershing had been in France less than two months when he cabled the War Department for a force of lumberjack soldiers large enough to cut upwards of 25,000,000 board feet per month for the American Expeditionary Force. A year later, the requirements of the enormous army then planned for and being sent to France with all possible speed were put at over 73,000,000 board feet per month.

Such was the task marked out for the lumberjack regiments of the American Army, for the lack of ocean transport made it necessary to obtain practically all of this material from French forests. The organization of these lumberjack units, all of which were combined later in the 20th Engineers (Forestry), began in May, 1917, and continued until March, 1918. By May, 1918, forty-eight

companies of forest and road engineers, each 250 men strong, had been sent to France. The core of a 49th Company was obtained subsequently from the New England sawmill units which were sent to old England in

the early summer of 1917 to cut lumber for the British Government. These troops represented every State in the Union. Practically every forestry agency in the country, together with many lumber companies and associations, took off their coats to help in obtaining the right type of men. The road engineers of the United States took hold of the organization of the twelve companies of troops designed for road construction in a similar spirit. The lumber units were officered largely by picked men of experience in forest industries of America; and the road units by road and construction engineers of exceptional technical ability.

The earlier units were made up entirely from volunteer enlistments. The later units contained a large proportion of men from the draft, selected for forestry work mainly on the basis of their former occupations, together with many volunteers beyond the draft age from among the experienced loggers and sawmill mechanics of the country. But there was no distinction between volunteer

or drafted soldiers in the way the American lumberjacks hit their job in France. These men represented the best of their hardy and resourceful profession in the United



LIEUT.-COL. W. B. GREELEY

States. They came straight from her forests and saw-mills, trained in her woodcraft, with all of the physical vigor, the adaptability to life in the open, and the rough and ready mechanical skill of the American woodsman. They knew their work and were ready to put all that they had into it.

Furthermore, these lumberjack soldiers felt in a peculiar way that their country was behind them. This was not only in the focusing of national forces from every

crews made off with the laurels of certain pure lumberjack units, in the records of the operations for production.

To meet the growing requirements of the American Army, Engineer Service battalions were rapidly added to the forestry and road troops during the summer and fall of 1918. At the end of hostilities, thirty-six Service companies were working with the 20th Engineers. The first four of them were white troops, organized as the

"The lumbermen and foresters of the United States may well take pride in the men who have represented them on the American Expeditionary Force. Now they are returning, better men for the sacrifices they have made, for the sense of organization and responsibility which they have learned, for the difficulties which they have mastered, and for the understanding which they have gained of forest culture and forest thrift in France. Such a body of trained men represent an asset of the utmost value to the forest industries of America. Let us recognize their worth and their capacity by an intelligent direction of the return of these soldiers to civil life in positions where their experience in national service can be effectively utilized."—Lt. Col. W. B. Greeley, 20th Engineers (Forestry).

point upon winning the war, but in the special efforts of the forest industries to man and equip the lumber regiments. Many lumber companies had sacrificed their own interests in urging valued employees to join the ranks of the forest regiments. In many cases differences in pay were made good by old employers or provision made for the families left behind. And the lumberjack soldiers felt, too, the backing of friendliness and forethought which followed them to France, in the organized steps taken by the lumber and forestry associations for their comfort and welfare.

Special credit is due to the officers and men of the three battalions, the 41st, 42nd, and 43rd Engineers, which were organized and equipped for road and construction work in connection with forestry operations. They came to France keen to take up this task, for which they too had been especially fitted by training and experience.

But the necessities of war dictated otherwise. They landed in France to find the undermanned Forestry Section struggling to keep up with the timber needs of an army already twice the size of that originally intended. It was necessary for these road builders to turn lumberjacks themselves, cutting fuelwood, piling, or entanglement stakes as occasion demanded and manning the new sawmills which were installed as fast as they arrived from the United States. The road companies took hold of this work in which most of them were unaccustomed, with splendid spirit and in the end some of their mill

503d Engineers. They contained a large proportion of railroad men and other skilled workers, and were soon in the mills and woods and on railroad jobs, on all fours with the forestry troops. Upon the other Service Companies, composed of colored troops, fell the brunt of cutting the fuelwood which the Quartermaster was calling for by the hundreds of thousands of cords. But several sawmill crews composed largely or entirely of black soldiers made exceedingly creditable records.

The first board was cut by the American troops in France, at a little French mill in the Jura Mountains, on November 26, 1917. The first American mill began sawing near Gien, on the Loire River, November 29, 1917. Still earlier, another company of the old 10th Engineers began cutting fifty-foot piling in the pine forests of the Landes, hauling them out of the woods on the running gear of army supply wagons, by man power. On the

Lt. Col. W. B. Greeley is Assistant Forester of the United States. He has had general charge of all forestry operations of the regiment and his administrative ability, his knowledge of forestry and lumbering had much to do with the successful work of the regiment. The French have honored him by presenting him with the Legion of Honor. Shortly before this honor was conferred upon him he induced the French government to reduce its bill against the A. E. F. for forest acquisition about 2,000,000 francs.

Editor, American Forestry Magazine.

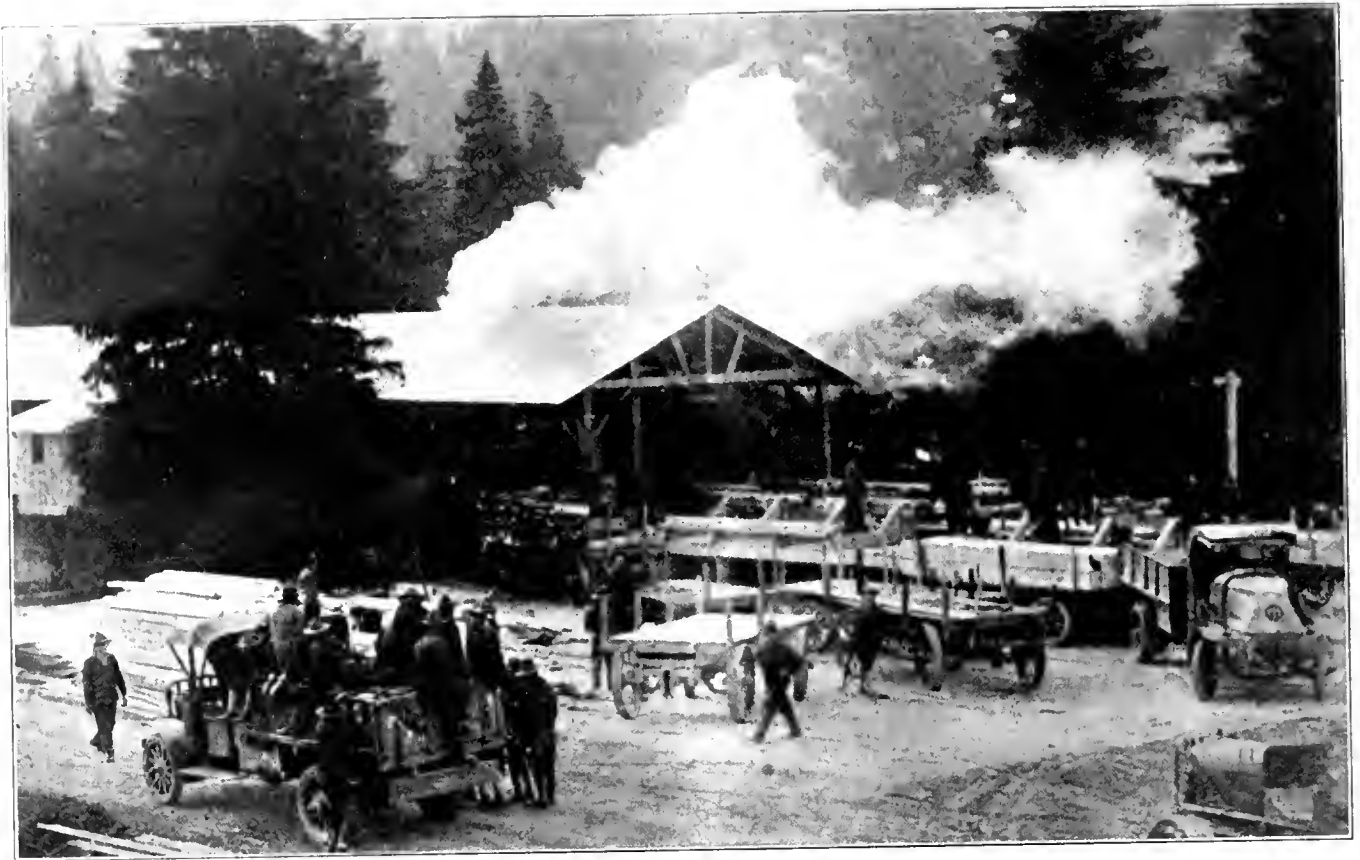
date when the armistice was signed, the 20th Engineers were operating eighty-one American sawmills in France and cutting 2,000,000 feet of lumber, ties, poles and piling every working day. One year after the first American saw bit into its first log in France and shrilled defiance at the Kaiser, the forestry troops of the American Expeditionary Forces had cut 300,000,000 board feet of lumber and ties, 38,000 piles, 2,878,000 poles of all sizes, and 317,000 cords of fuelwood. It is impossible, in a few words, to tell of the labor, the Yankee ingenuity, and the resolution to back up our fighting doughboys which were



A LOG CABIN BUILT NEAR PONTENY, LANDES, FRANCE, BY A SQUAD OF AMERICAN RIVER DRIVERS IN THE 29th REGIMENT. THE FRENCH NEVER USE WOOD SO LAVISHLY IN BUILDING



OFFICE BUILDING AT CAMP OF THE ENGINEERS IN FRANCE



MILL OF 20th ENGINEERS IN MOUNTAINS OF EASTERN FRANCE. LARGE TIMBERS BEING LOADED ON TRAILERS READY FOR HAULING TO THE RAILWAY

called for to win these results. Nor is it possible to describe the pressure upon all of us during the summer and fall of 1918 when every lumberjack in the regiment felt the tenseness of the final grapple and put everything he had into it. I will never forget the big mill at Eclaron as I saw it one October night — sparks streaming from its stacks, its two carriages flashing back and forth, loads of oak logs creaking up to the mill deck, cars being shunted about, ties loaded into them hot from the saws, and the sober, earnest faces of the men as they worked under the electric lights. They were shipping 5,000 ties daily to the Argonne offensive. That scene was typical of the eighty or more forestry operations in France during the great drive. It is doubtful if American resourcefulness was ever put to a harder test than during the first months of the forestry work



AN AMERICAN FORESTRY ENGINEER AT THE WATER BAG WHICH CONTAINS THE CAMP'S SUPPLY OF DRINKING WATER. THE ROOF OVERHEAD KEEPS THE SUN OFF THE BAG, AND A DITCH CARRIES AWAY THE LEAKAGE

in France. One company of the 4th Battalion began skidding ties with harness made out of ropes and old sacks, and bridles fashioned from twenty-penny nails and wire. This "hay-wire" camp speedily made off with the monthly records of the section for tie production. During the long, anxious wait for the arrival of the American sawmills, French mills of various antique designs were utilized at many points. On his introduction to one of these, a millwright from the northwest offered to eat its daily cut. The French mills were aggravations of the flesh and promoters of profanity. They all had to be bolstered up, more or less rebuilt, have carriages devised out of any odd lots of machinery at hand, and new saws added. Poor as they were, they served to tide the army over its first few months in France, and their production under the "ancient regime" was



BARBED WIRE STAKES, TO BE USED LATER AT THE FRONT, CUT AND STACKED ALONG BROAD GAUGE RAILWAY IN A HARDWOOD FOREST IN CENTRAL FRANCE



LOADING MARITIME PINE PILING IN SOUTHWESTERN FRANCE, NEAR PONTENX, LANDES



ANOTHER TYPE OF THE 20-M AMERICAN SAWMILLS USED BY THE AMERICAN FORESTRY AND LUMBERING TROOPS IN FRANCE

doubled or trebled by the lumberjack soldiers.

As the American mills were installed and production jumped month by month, fierce joy of rivalry seized the souls of the forest engineers. Time would fail to tell of the early contest between A and B Companies of the 10th Engineers, when records stood but a day or two and our "ten-thousand" mills showed up as twenty-five and thirty thousand a day producers. The largest day's cut at any forestry operation was turned out by the 27th Company at Mouthe, which in 23 hours and 35 minutes cut 177,486 board feet of fir lumber and timbers on a "twenty-thousand" mill. The largest twenty-hour cut, 163,376 feet, was made by the 37th Company (Old F Company of the 10th Engineers) at Levier with the same type of mill and product. The 26th Company at La Cluse holds the record for a twenty-hour run with a "ten-thousand" mill, 78,881 feet; close behind came the 24th Com-

pany with a record cut of 68,650 feet, the 30th with a cut of 63,849 feet, and the 49th Company at Murat, organized to build roads, with 63,000 feet. The 23d Company, at Marchenoir, holds the record for a twenty-hour cut with a "ten" mill in hardwoods, knocking off 55,539 feet. The 22d Company, at La Gavre, pushed its rival hard, however, with a twenty-hour cut of 49,416 feet of oak lumber and timbers. One of the best hardwood records is that of the 2nd Company, at Grande Mirebeau, which was determined to reach the million a month mark with a "ten" mill, and finally did so, in October, with a cut of 1,000,620 feet. One of the most remarkable achievements was that of the 19th Company, which in ten and one-half hours cut 64,047 feet of straight oak ties with a bolter mill rated at five thousand feet per day.

Small wonder that the American Lumberman has indicted the forest engineers of the American Expedi-



20th ENGINEERS FELLING LARGE BEECH TREE IN CENTRAL FRANCE



LOG DECKS ALONG A FLUME LEADING TO A MILL OF ONE OF THE COMPANIES OF THE 20th REGIMENT IN SOUTHWESTERN FRANCE



AMERICAN CAMP WITH TENTS "MUSHROOMED" IN THE SHADE OF A MARITIME PINE FOREST NEAR THE ATLANTIC COAST IN SOUTHWESTERN FRANCE



VIEW OF AUREILHAN LAKE, FRANCE, FROM AMERICAN 20-M SAWMILL. LOGS WERE TOWED ACROSS THE LAKE FROM THE MOUTH OF THE COURANT RIVER, BROUGHT TO THE BOOMS AT THE EDGE OF THE LAKE, THEN POLED ALONG THE CANAL TO THE POINT IN THE FOREGROUND WHERE THEY WERE LOADED UPON A SMALL CAR WHICH WAS PULLED BY CABLE UP THE INCLINE INTO THE SAWMILL. THE LARGE HEAP OF SAWDUST AT THE RIGHT WAS PRODUCED BY THE MILL AS THE RESULT OF SEVERAL MONTHS' OPERATION



A TRAIN LOAD OF TIES BEING TRANSPORTED BY NARROW GAUGE RAILWAY TO THE MAIN LINE IN THE MARITIME PINE FORESTS OF SOUTHWESTERN FRANCE

tionary Forces for "cruelty to machinery." But the Hun wanted war—and, by the shades of the forest primeval, he should have it. It is difficult to stop in recording these instances of how the American lumberjack "tied into" their work in France. The 6th Battalion, working for the British Army at Castets, cut 124,242 feet in nineteen hours with a twenty-thousand Canadian sawmill, and 72,697 feet in twenty hours with a French band mill whose makers would have been aghast at such perform-

gineers contain records of twenty thousand foot mills set up and running fourteen days after the first machinery arrived; of a ten-thousand mill dismantled, moved fifty miles, re-set, and sawing on the eighth day; and of another "ten" mill moved about half that distance and sawing its first log forty-seven hours after the last log left its carriage at the old set. These were not holiday contests, staged after weeks of preparation. They are cited to illustrate the spirit of the 20th Engineers;



A LOG LANDING OF A 20th REGIMENT DETACHMENT IN ONE OF THE FORESTS OF FRANCE

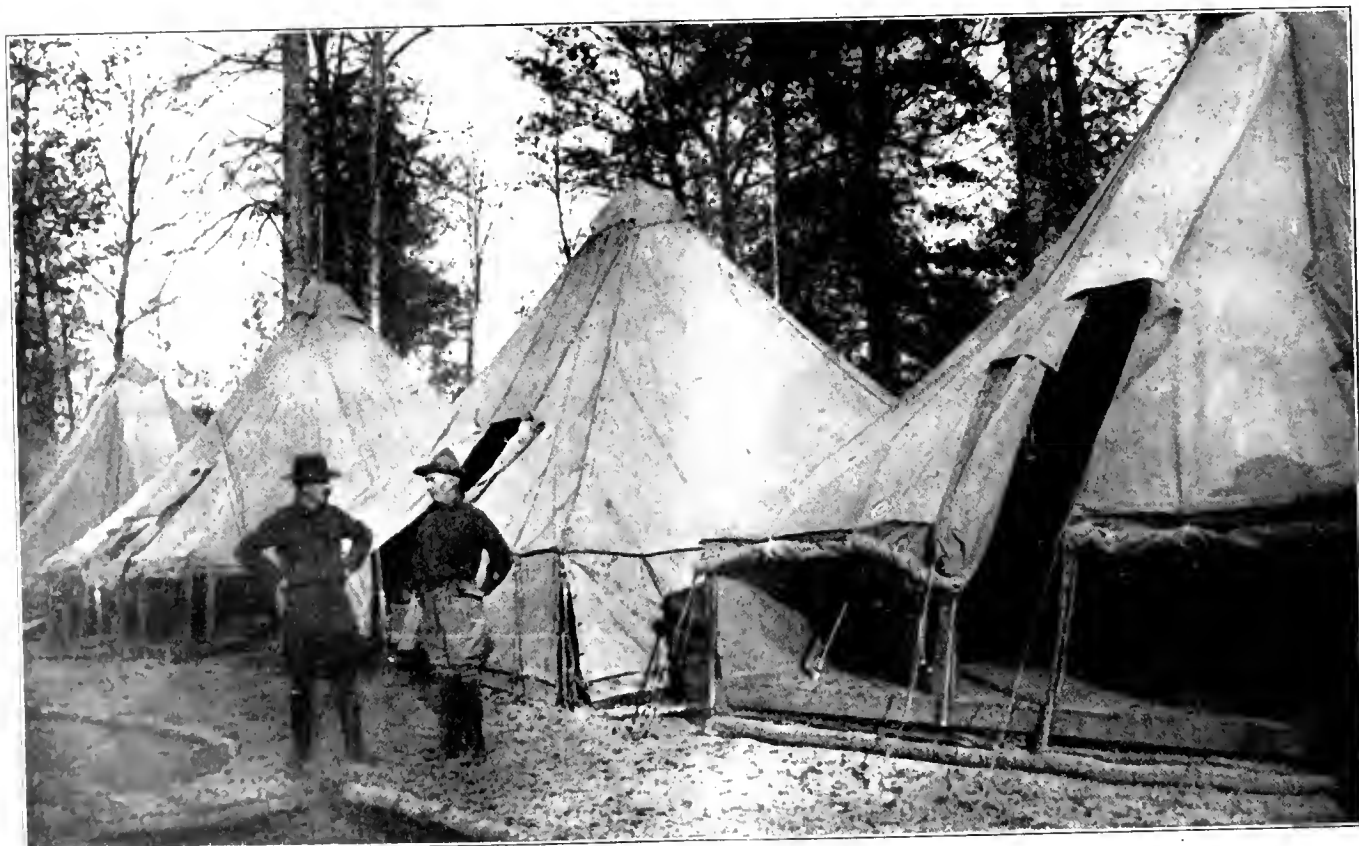
ances. The 13th Company, at Brinon, cut 1,361 pine logs on a "ten" mill in twenty hours, with a yield 53,895 feet of lumber. Many of the American "twenty" mills cut steadily upwards of 1,200,000 board feet per month, and several of them exceeded 2,000,000 feet monthly on their best runs. The spirit of "hitting her hard" pervaded every camp. The 19th Service Company, at Collonges, not to be outdone by the chesty mill crews, organized a fuelwood contest in which 100 black soldiers averaged 6.31 cubic meters of cut wood daily for a week. It is even rumored that a red-headed captain of the old Tenth, learning from his own spies that his monthly record was in jeopardy, connived with his men to put on a Sunday night shift, something strictly tabooed by the Forestry Regulations. The annals of the 20th En-

but the great service of the regiment lay in its sustained effort, month after month, on exacting physical labor, much of it under the incessant rains and in the indescribable mud of France.

In the spring of 1918 came orders to furnish 15,000 piling in lengths up to 100 feet, with all possible haste. These timbers could not be brought from the United States and were essential to complete the docking facilities required by the rapid increase in the American Expeditionary Force. Again the resourcefulness of the forest engineers was put to the test, for every nook of France had to be scoured for long timbers and practically every tree that was large enough had to be cut—no matter where it stood. The 2d Battalion—up in the Vosges Mountains—covered itself with glory, get-



AN AMERICAN 20-M SAWMILL IN THE SAND DUNE COUNTRY OF SOUTHWESTERN FRANCE, NEAR THE COAST. MARITIME PINE FOREST IN THE BACKGROUND.



AMERICAN FORESTRY ENGINEERS IN FRONT OF TENTS IN THEIR CAMP AT ST. DIZIER, HAUTE MARNE



HAULING PILING 60 TO 80 FEET LONG BY MEANS OF MACK TRUCK AND TRAILER FROM THE FOREST TO THE SHIPPING POINT IN EASTERN FRANCE



CAR LOAD OF MARITIME PINE LOGS BEING DUMPED INTO AUREILHAN LAKE TO BE TOWED TO THE AUREILHAN AMERICAN SAWMILL NEAR PONTENX, LANDES. NARROW GAUGE RAILWAY SHOWN. THE MULES BRING THE LOGS FROM THE PINE FORESTS OF THE SAND DUNES.



LOADING MARITIME PINE LOGS ON NARROW GAUGE RAILWAY CARS FOR TRANSPORTATION TO AMERICAN 20-M MILLS IN SOUTHWESTERN FRANCE. THE PINE FOREST IS HERE CUT CLEAN. BIG WHEELS USED TO SKID LOGS TO THE RAILWAY SHOWN AT THE RIGHT

ting out 9,399 "long and straight" ones faster than the docks could use them. Nor was it a simple trick to get 90 and 100-foot sticks out of the little gullies and down the long, winding roads of the Vosges. The 5th Battalion, meanwhile, was running an express train service with tractors and steel-tired trailers—taking out 80-foot spruce piles over ten miles of French highways. This Battalion furnished over 5,000 piles for the American docks.

New demands upon the forestry troops followed the formation of the American First Army. A flying squadron of lumberjacks was organized by the 2nd Battalion, to work in small units with portable mills at the advance Engineer dumps and cut from day to day bridge timbers, mine sets, bomb proofing—the material most urgently required and which could not be forwarded quickly enough from the rear. All told, the 20th Engineers operated thirteen of these advance camps. Their lumberjack soldiers had a real taste of work close to the front, with frequent occa-

sion to take shelter from bombardments and night bombing raids. And it was while scouting for a new camp in

the Argonne that Capt. Harry H. McPherson and Lieut. Wilford A. Fair, of the 20th Engineers, were shot down by German machine-guns.

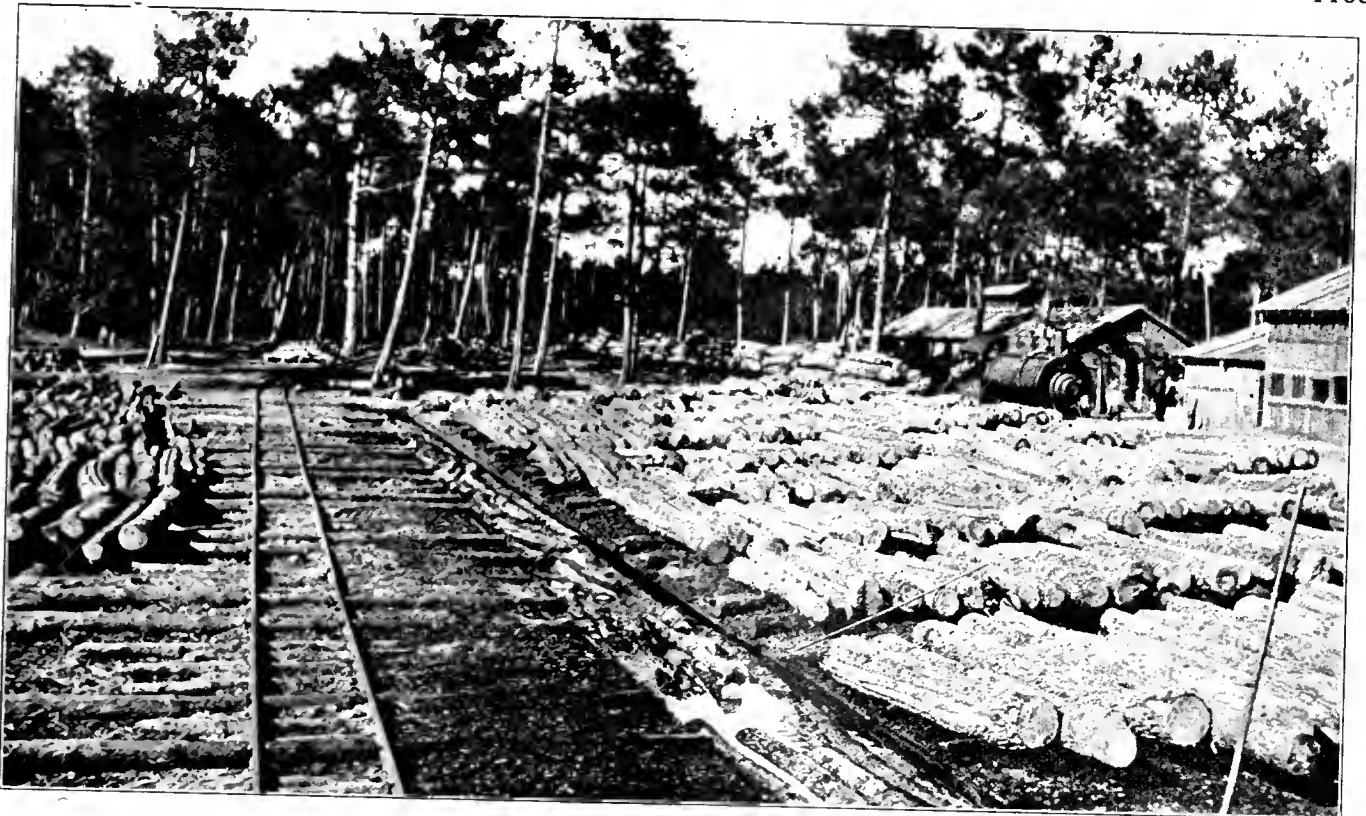
Last December Colonel James A. Woodruff, commanding the 20th Engineers, summed up the work of the twelve thousand odd lumberjacks comprising the regiment in a general order which was a cordial commendation. (See page 1092.)

Not all of us were permitted to share in this achievement. With sorrow but with pride the 20th Engineers recall the ninety-one men of the 6th Battalion who won their golden stars on the transport *Tuscania*. The story is best recorded in the words of an officer of that battalion:

"On the morning of the eighth day out from Halifax, the convoy was met by seven British destroyers, which romped along like porpoises in the heavy seas. With this protection everybody on board felt pretty safe, especially



AN OFFICER OF THE 20th ENGINEERS AT A BATTALION HEAD-QUARTERS IN FRANCE



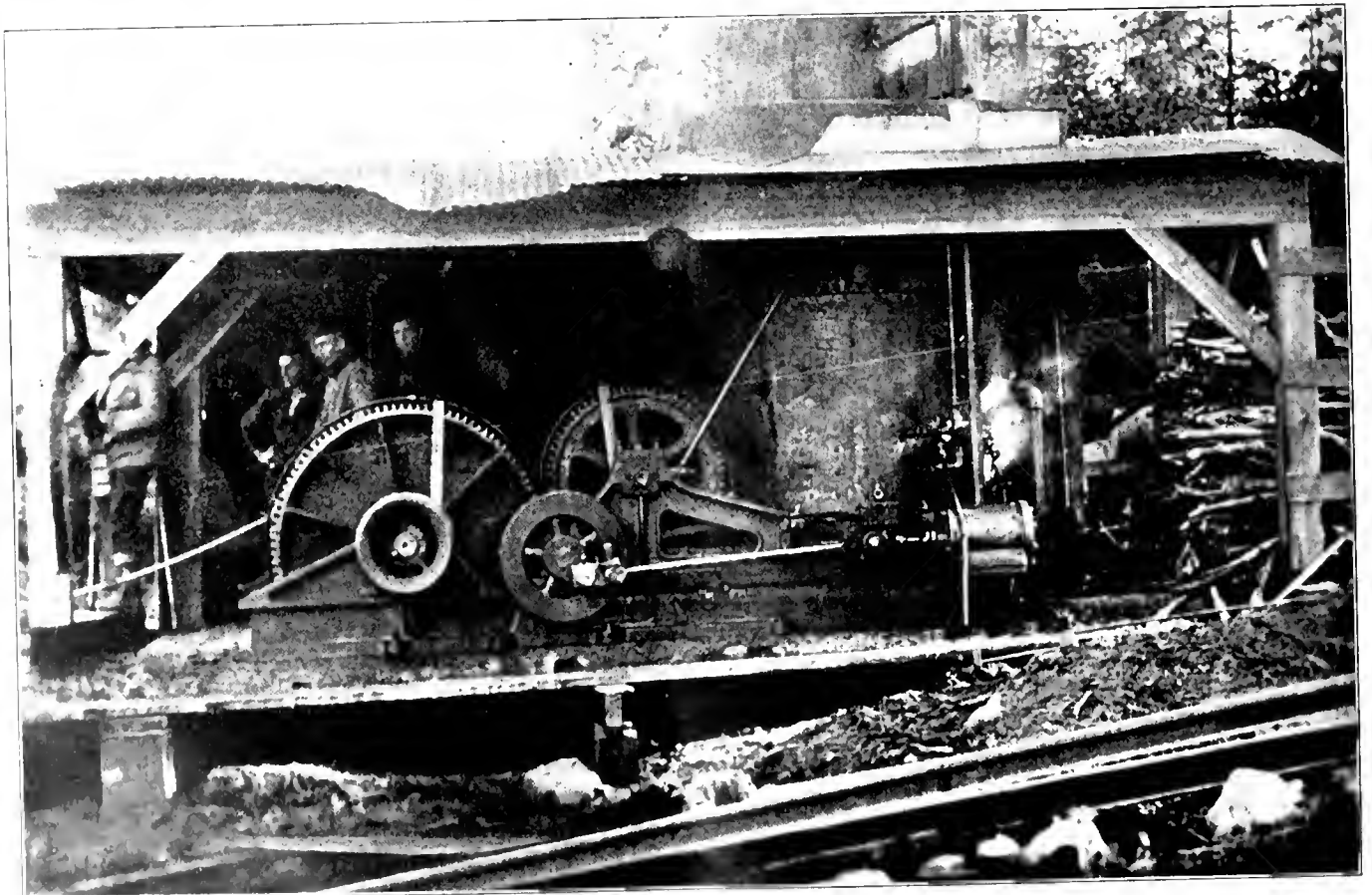
LOG TRAIN AT THE RIGHT COMING FROM THE MARITIME PINE FOREST TO THE LABROQUETTE 20-M AMERICAN MILL NEAR PONTENX, LANDES. THE LOGS ARE UNLOADED ON TO SKIDS AND ARE THEN ROLLED INTO THE FLUME IN THE FOREGROUND, ALONG WHICH THEY ARE FLOATED TO THE MILL. THE LOGS ARE LIFTED FROM THE FLUME INTO THE MILL BY CHAINS. MARITIME PINE FOREST IN THE BACKGROUND



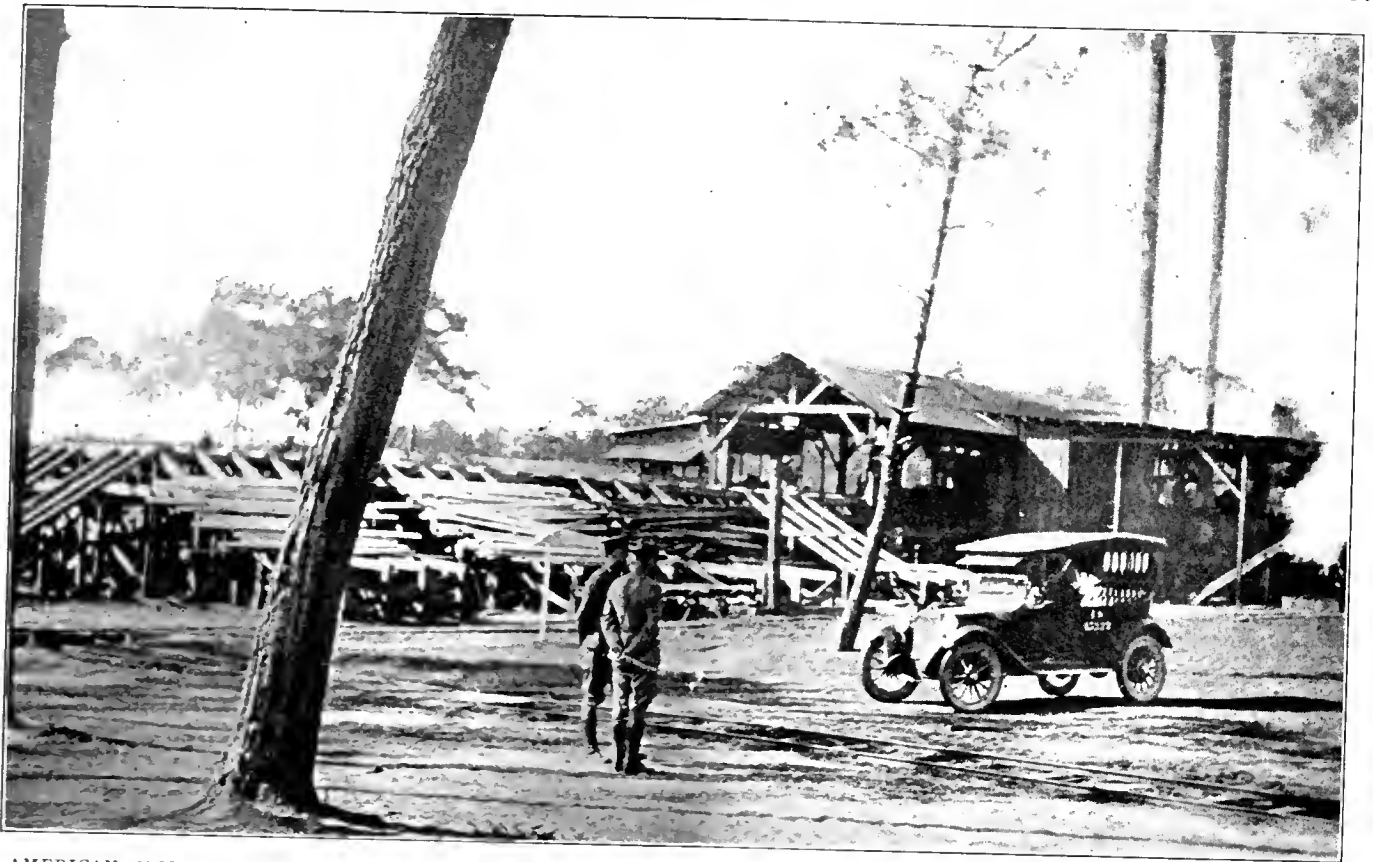
HARDWOOD LOGS DECKED NEAR MILL. LOAD OF LOGS JUST GOING TO MILL ON MOTOR TRUCK. THINNED HARDWOOD FOREST IN BACKGROUND



GENERAL VIEW OF AN AMEX MILL OF THE 20th ENGINEERS IN FRANCE



A LOGGING DONKEY ENGINE USED TO LET THE CARS LOADED WITH LOGS DOWN A 72% GRADE FROM THE CUTTING ON A HILLSIDE TO A 20th REGIMENT SAWMILL NEAR EPINAL, IN FRANCE



AMERICAN 20-M SAWMILL NEAR PONTENX, LANDES. COL. BENEDICT WITH HIS BACK TURNED, IN THE FOREGROUND, STANDING NEAR NARROW GAUGE TRACK OVER WHICH LUMBER IS TRANSPORTED THREE MILES TO THE SHIPPING YARD



LOADING HARDWOOD LOGS ON LOG TRUCK IN FOREST OF CENTRAL FRANCE

when, on the afternoon of February 5, the shores of Ireland and Scotland hove in sight. But at 5.45 that evening came a bang! bang! With the crash all lights went out, due to the electric plant being put out of commission, and the ship was left in absolute darkness. The men came pouring up onto deck from their quarters, two or three decks below; flares were lighted and everybody set to work lowering the life boats. In many cases, the members of the crew assigned

to do but wait and see what would happen next. No more destroyers seemed inclined to come to the rescue of the ill-fated 700. The Tuscania listed more and more to starboard; the flares burned out, leaving the ship in darkness. The chances of those left on board grew slimmer and slimmer as the icy water crept up closer and closer to the starboard rail. Then, slowly and quietly, out of the black night a long, black destroyer slipped alongside and, by pumping overboard forty tons



SMALL TOPS BROUGHT FROM THE FRENCH FOREST TO BE PILED UP NEAR THE MAIN RAILWAY LINE FOR USE AS FUEL. THIS SCENE IS IN THE SAND DUNE COUNTRY NEAR THE COAST IN SOUTHWESTERN FRANCE

to the boats failed to put in an appearance, and the soldiers, unaccustomed to this work, had to get the boats away as best they could. Some boats were unsuccessfully launched, causing their occupants to be thrown into the icy water. After all available boats and rafts had been launched and two loads of men had been taken off in two British destroyers, which came alongside, 700 men were still left on board with nowhere to go and nothing

of oil, was able to accommodate all those left on the sinking ship."

During the long wait, one of the companies of the 20th, after seeing comrades drowned in front of them, and not knowing what was in store for themselves, stood in line in perfect order and sang "Where do we go from here, boys? Where do we go from here?"

LAGUNA MOUNTAIN RECREATION AREA

AN important new development of recreation in the open is taking place in San Diego county on the Cleveland National Forest, in California. This is the Laguna Mountain recreation area, very careful plans for which were worked out in advance by the United States Forest Service. The plans are being carried out under expert supervision, and the Forest Service has already spent about \$60,000 in the development of the area. It is situated only fourteen and one-half miles from the San Diego-Imperial Valley State highway, with which

it is connected by an excellent automobile road. It can be reached in a few hours by the people of the hot interior valleys. It has both public camping-grounds and private lots, which are leased to individuals for a term of years, thus making it worth while for the lessees to build substantial cabins. Many people are already taking advantage of the opportunity, and Laguna Mountain bids fair to become one of the best outing areas in Southern California.

THE FOREST ENGINEERS

By LT.-COL. HENRY S. GRAVES

THE Forest Engineers performed a very important service in the war. For the first time in history, it was necessary to organize military forces specially trained and equipped for work in the forest, and when the call came the foresters and lumbermen responded eagerly. There was developed an organization of splendid efficiency—a fine body of experienced men, well officered. They adapted themselves quickly to the conditions under which they had to work, and met the burdens placed upon them with a fine spirit of self-sacrifice. They had many difficult conditions to meet and many obstacles to overcome, and they succeeded in their task. They richly deserve the praise which has consistently been bestowed upon them.

The first call for foresters and lumbermen came through a request made by General Bridges, of the British Mission, soon after we entered the war, for a thousand men to work in the woods behind the British lines. To meet this request, the War Department decided to organize an engineer regiment, and asked for assistance from foresters and lumbermen in the recruiting of the force. Col. J. A. Woodruff, of the Corps of Engineers, was given the command, and his work in organizing the 10th Engineers, and later in directing all the forestry forces in France, was of exceptional merit. He has already received well earned honors in France; and American foresters and lumbermen are unanimous in their praise of his work and his leadership.

The French government also made a request through Marshal Joffre for a thousand men to help in the forests behind the French lines. It became apparent, however, very soon after the arrival of General Pershing and his staff in France, that the requirements of our own army would necessitate the use of the first forestry troops for the American armies. It was necessary, therefore, to defer giving direct assistance to the British and French. Fortunately, it proved possible to fulfill our obligations to our allies in this matter before the end of the war.

The first division of the army reached France early in the summer of 1917. There was immediate need for lumber, not only for barracks but for a great variety of miscellaneous purposes. The assistance given us by the French and British before the Forest Engineers with their equipment could arrive and begin the manufacture of lumber was very substantial, and was given at a time when both the British and French armies needed for their own uses, while battles were going on, every bit of wood and timber they could possibly secure. It was, however, at best a lean time for the American armies until the Forest Engineers could begin sawing operations.

The first battalions of the Forest Engineers arrived in France early in October, 1917. They had some of their

woods equipment with them, but it was some months before their sawmill material and all of their logging and transport equipment arrived. Pending the arrival of this equipment, they found themselves in a difficult position. There was a great need for lumber for the armies, and though the forestry troops were at first inadequately equipped, were expected to produce it. It was an inspiration to see the way the troops adapted themselves to the conditions, put in their time efficiently, produced timber which could be used for various engineering purposes, and prepared the way for the quick manufacture of lumber when the mills should arrive.

When the equipment did arrive, all of the preliminary work in the careful selection of officers and men and in the preparatory work in France began immediately to count. Every man swung into line and gave his utmost strength to the task at hand, with the result that the small portable sawmills were made to produce quantities unknown before. What seemed insuperable obstacles in the matter of transportation were overcome, and the lumber was actually gotten to the armies in time to render service at critical periods.

An important part of undertaking was the acquisition of timber and the location of operations. The French and British representatives co-operated admirably in this matter, so that any possible competition between the Allies in the procuring of material and in prices was eliminated. The corps of men engaged in this work deserve a great deal of credit. Those in charge of the negotiations had a delicate task to perform in their relations with the Allied governments. The men in the field were carefully selected from among the foresters and logging engineers, and were successful in finding bodies of timber suitable for the armies' needs.

The high quality of the personnel of the Forest Engineers has been commented upon by every one familiar with the organization. To this fact and to the able leadership of the officers in charge is due the unqualified success of the work. To set apart the names of those to whom credit is due would be to take many a leaf from the regimental muster roll, from Colonel Woodruff and Lieutenant-Colonel Greeley, the two men who carried the chief burden of the enterprise; Colonel Mitchell, who organized the 20th; Lieutenant-Colonel Kelley and Johnson, at headquarters, and Lieutenant-Colonel Woolsey and Major Moore, who negotiated the purchases with the French, through a long list of officers and men. Those who participated in the forestry work in France may well be content with their record. The forestry and lumber fraternity is very proud of what they accomplished.

ORGANIZATION OF 20TH ENGINEERS (FORESTRY)

BRIG. GENERAL EDGAR JADWIN
DIRECTOR OF CONSTRUCTION & FORESTRY

COL. J. A. WOODRUFF
C. O., 20TH ENGINEERS & DEP. DIR. C. & F

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LIEUT.-COL. W. B. GREELEY
Chief, Forestry Section

Acquisition of Timber
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MAJ. WOOLSEY
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Technical Equipment and Operation Supplies
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CAPT. LAMMERS

Fuelwood Project, Advance Section
LIEUT.-COL. PECK CAPT. BRUCE
MAJ. STUART CAPT. KITTREDGE

Military Administration Personnel
CAPT. G. P. GRAHAM
Adjutant

Welfare
CHAPLAIN WILLIAMS

SECTION FORESTRY OFFICER
BASE SECTION No. 2

LIEUT.-COL. BENEDICT
MAJ. W. L. LaLONDE

DISTRICTS
Pontenx Mimizan
Dax Lapit

SECTION FORESTRY OFFICER
ADVANCE SECTION

LIEUT.-COL. CHAPMAN

DISTRICTS
Epinal Eclaron
Dijon Besancon

BATTALION AND DISTRICT COMMANDERS

DAX—1st Battalion,
MAJOR BROOKINGS

EPINAL—2nd Battalion,
MAJ. JOHNSON, s. o.

DIJON—3rd Battalion,
MAJOR SANBORN

MIMIZAN—4th Battalion,
CAPTAIN PHIPPS

GIEN—5th Battalion,
CAPT. LYNCH

LAPIT—6th Battalion,
MAJOR KELLOGG

CHATEAUROUX—
7th Battalion,
CAPTAIN MAAS

BAUGE—8th Battalion,
CAPTAIN VAIL

BOURG—9th Battalion,
MAJOR BARNES

BOURGES—
10th Battalion,
MAJOR HINKLEY

PONTENX—
11th Battalion,
MAJOR LAFON

BESANCON—
12th Battalion,
MAJOR KELLY

ECLARON—
13th Battalion,
MAJOR SPENCER

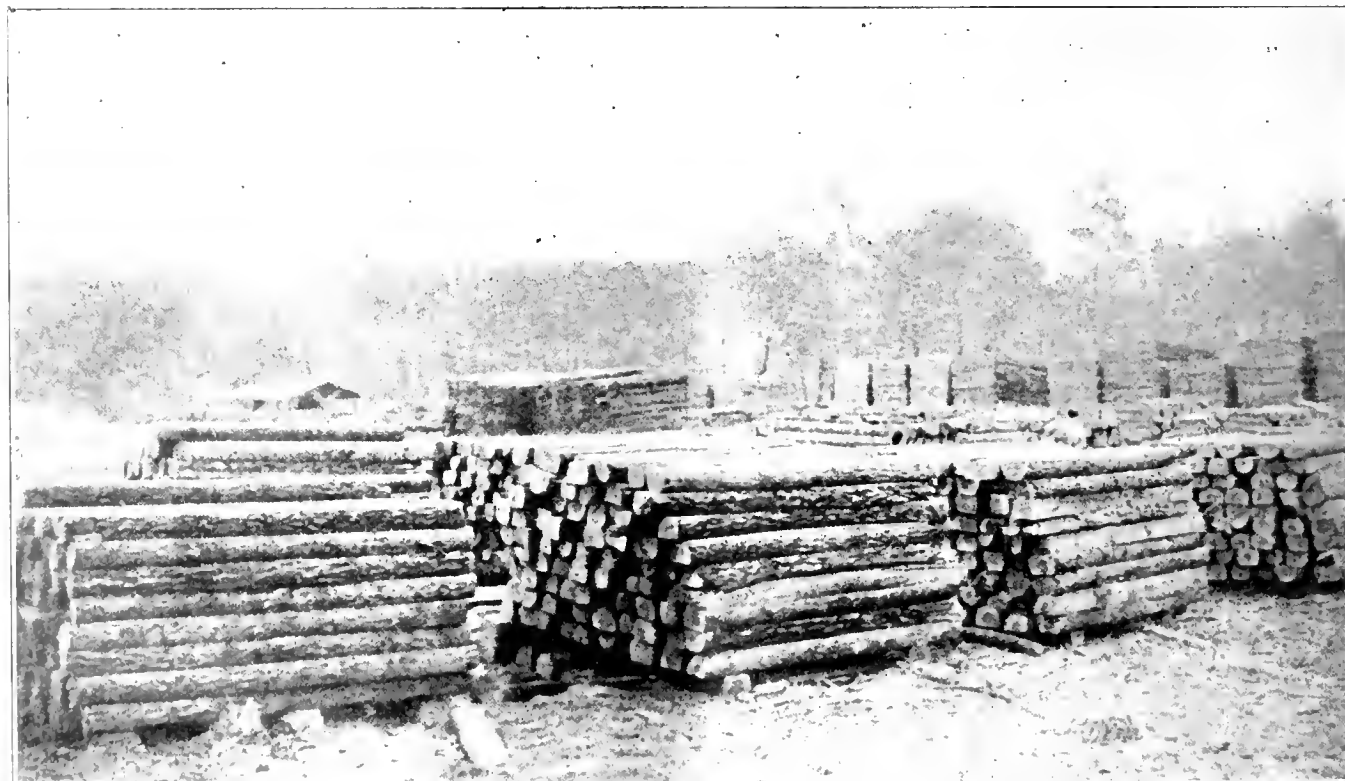
LEPUY—
14th Battalion,
MAJOR BARTELME

20th ENGINEERS (FORESTRY) RECORD OF DEVELOPMENT AND PRODUCTION

1. The 10th Engineers arrived at Nevers October 9, 1917.
2. All units of 10th Engineers arrived at their assignments by November 1, 1917.
3. The first mill to operate was a French mill which commenced sawing on November 25, 1917 at Levier (Doubs).
4. First American mill commenced on November 27, 1917, at Mortumier operation, near Gien (Loiret).
5. On December 1, 1917, 3 mills were in operation—2 French and 1 American.
6. Production in December, 1917: Lumber, 321 M.B.M.; Piling, 205 pieces; Ties, 12,031 pieces; Poles, 20,025 pieces; Logs, 33,864 pieces; Cordwood, 4,164 steres; Faggots, 1,500 steres. During December, 1917, 2 American and 4 French mills were operating.
7. 1st Battalion of 20th Engineers arrived November 28, 1917.
8. First mill of 20th Engineers commenced operation on or about January 15, 1918, at Mur-de-Sologne (Loir-et-Cher).
9. The following entries show the production by months and number of mills in operation at end of each month:
 - JANUARY—10 mills operating. Production: Lumber, 1,369 M.B.M.; Piling, 740 pieces; S. G. Ties, 815 pieces; small Ties, 7,100 pieces; Misc. R. P., 29,740 pieces; Cordwood, 3,303 steres.
 - FEBRUARY—21 mills operating. Production: Lumber, 2,892 M.B.M.; Piling, 720 pieces; S. G. Ties, 22,345 pieces; Small Ties, 14,856 pieces; Misc. R. P., 460,662 pieces; Cordwood, 12,433 steres; Faggots, 200 bdls.; Road Plank, 1,700 pieces; Bridge Ties, 200 pieces.
 - MARCH—34 mills operating. Production: Lumber, 6,965 M.B.M.; Piling, 857 pieces; S. G. Ties, 80,099 pieces; Small Ties, 60,100 pieces; Misc. R. P., 270,496 pieces; Cordwood, 15,932 steres.
 - APRIL—41 mills operating. Production: Lumber, 14,578 M.B.M.; Piling, 1,513 pieces; S. G. Ties, 152,654 pieces; Small Ties, 104,685 pieces; Misc. R. P., 334,556 pieces; Cordwood, 23,899 steres.
 - MAY—48 mills operating. Production: Lumber, 18,253 M.B.M.; Piling, 11,760 pieces; S. G. Ties, 178,988 pieces; Small Ties, 122,797 pieces; Misc. R. P., 221,555 pieces; Cordwood, 47,794 steres.
 - JUNE—59 mills operating. Production: Lumber, 26,727 M.B.M.; Piling, 7,576 pieces; S. G. Ties, 265,151 pieces; Small Ties, 150,359 pieces; Misc. R. P., 190,742 pieces; Cordwood, 67,500 steres.
 - JULY—59 mills operating. Production: Lumber, 24,102 M.B.M.; Piling, 3,296 pieces; S. G. Ties, 298,163 pieces; Small Ties, 172,619 pieces; Misc. R. P., 227,865 pieces; Cordwood, 90,487 steres.
 - AUGUST—66 mills operating. Production: Lumber, 30,601 M.B.M.; Piling, 1,934 pieces; S. G. Ties, 384,960 pieces; Small Ties, 136,143 pieces; Misc. R. P., 446,069 pieces; Cordwood, 166,339 steres.
 - SEPTEMBER—80 mills operating. Production: Lumber, 30,307 M.B.M.; Piling, 3,653 pieces; S. G. Ties, 517,178 pieces; Small Ties, 133,896 pieces; Misc. R. P., 574,205 pieces; Cordwood, 144,178 steres.
 - OCTOBER—81 mills operating. Production: Lumber, 29,134 M.B.M.; Piling, 6,905 pieces; S. G. Ties, 692,208 pieces; Small Ties, 106,588 pieces; Misc. R. P., 248,826 pieces; Cordwood, 151,464 steres.
10. On October 31, 1918, there were 81 mills in operation. Total strength of forestry troops in France that date (20th Engineers plus Service Companies), 360 officers and 18,183 enlisted men; aggregate of 18,543 on forestry work. No record is available as to actual status on November 11, 1918.
11. On October 31, 1918, there were actually 84 going operations.
12. On November 11, 1918, 14 district headquarters were administering the work of the forestry troops.
13. On November 1, 1917, 2 district headquarters were established, one at Pontoux-les-Forges (Landes) and the other at Levier (Doubs), Besancon taking its place.
14. On September 9, 1918, Major Benedict was named as Section Forestry Officer at Bordeaux and took over duties on October 1, 1918. On September 9, 1918, Major Chapman was named as Section Forestry Officer at Nogent-en-Bassigny (Haute Marne) and took over his duties on September 16, 1918. The headquarters of the latter were moved to Neufchateau (Vosges) on October 21, 1918.
15. All forestry units combined October 18, 1918, per G. O. 47, S. O. S., of that date.
16. Lt. Col. Greeley arrived in France August 21, 1917, accompanied by 2 officers and 9 civilians. The officers were First Lieut. Stanley L. Wolfe and First Lieut. Clarence E. Dunston; the civilians (all later commissioned) were Theodore S. Woolsey, Donald Bruce, Swift Berry, R. Clifford Hall, Ralph C. Staebner, Fred B. Agee, William H. Gibbons, Joseph Kittredge and W. H. Galleher.
17. Lt. Col. Graves and Major Moore arrived June 20, 1917.
18. Forestry Section established as a part of the Engineer Supply Office September 25, 1917.
19. Prior to September 25, 1917, Forestry Section was a part of Office of Chief Engineer, A. E. F. (Gen. Taylor).



PORTIONS OF TRESTLE BUILT BY THE 20th ENGINEERS IN THE MARITIME PINE FOREST IN THE LANDES, IN SOUTHWESTERN FRANCE TO TRANSPORT FOREST PRODUCTS FROM THE WOODS TO THE MAIN LINE



MARITIME PINE RAILWAY TIES PILED READY FOR SHIPMENT; ALSO LUMBER PRODUCED AT AMERICAN SAWMILL IN MARITIME PINE FOREST IN SOUTHWESTERN FRANCE

FRENCH FORESTS IN THE WAR

By MAJOR BARRINGTON MOORE

AFTER the first two years of the war, the tonnage shortage made it impossible to ship wood to France, except aeroplane stock and the like, for wood is very bulky and the necessary shipping would have been enormous, more than could possibly have been spared with safety. Yet wood is a military necessity.

The ports of France were not built with a view to the landing of large armies, and were wholly inadequate; yet the speedy debarkation of the troops, with their munitions and supplies, had to be assured at all costs. The submarines forced the ships to come in convoys of ten or fifteen at once, requiring several times the docking space the same number of ships would have needed singly. Wharves, miles of wharves, were of immediate necessity. For this we must have piling and wharf timbers.

But, once the troops and supplies were landed, our difficulties did not end. It was necessary to find shelter for them. Sacks of flour cannot be left out in the rain. Warehouses became necessary, warehouses of gigantic size and capacity. Railroads had to be laid in the warehouses, one depot alone requiring eighty-five miles. Lumber for these warehouses had to be furnished immediately.

Wherever possible, we billeted our troops in houses to save barracks. But the crowded condition of the country, owing to the refugees from Belgium and the invaded parts of France made this inadequate. Our men

were dying of pneumonia. We simply had to have barracks. Every suitable building that could be found anywhere in France was turned into a hospital, but yet there were not enough. We required large quantities of lumber for hospitals.

After the army was landed, its supplies cared for, and the men were in billets or barracks—in all of which wood plays the leading role—the army must be moved forward. As a matter of fact, it had to be moved forward even before the preparations for landing were completed. Everything was done under the utmost tension, and still not rapidly enough.

The transportation of men and guns, with munitions and supplies, required the construction of new railroad lines and the double-tracking of others. Ties became more important than guns, because without the railroads the guns could not be brought to the front. When the Germans broke through in March and got within close range of Amiens, they paralyzed the main artery between the French and British armies. Another railroad had to be built, and built quickly. Fortunately, the Canadians had ties ready cut for an emergency.

In order to permit one organization to communicate quickly with another, it was necessary to construct telephone and telegraph lines. This called for thousands and thousands of poles.

Cooking the food and keeping the men warm meant tons and tons of fuelwood.



A FRENCH FOREST DEVASTATED BY WAR. MILITARY WORKS VISIBLE, RIGHT CENTER

At the front, trenches and other defensive works called for large numbers of props, barbed wire pickets, and other round material.

To bring up the artillery quickly over the shell-torn ground, it was necessary to build hasty roads with five-inch plank. The amount of lumber consumed as road plank was enormous.

Add to the foregoing an insistent demand for lumber to make packing cases and for countless smaller uses, and you will have some slight conception of wood as a military necessity.

chief of the French transportation system, told us with vivid emphasis that failure to send forestry troops promptly would spell disaster. General Pershing was so anxious about the situation that he personally dictated an urgent cable asking the War Department to stop sending fighting men until they had first sent forestry troops.

But, what will be the use of sending forestry troops and sawmills unless there is enough standing timber? The vital question then was, did France possess enough standing timber to fill the indispensable requirements not only of their own army and civil population, but of the



A PORTION OF THE FIRST AMERICAN FORESTRY CAMP, WITH OFFICE TENT AND Y. M. C. A. HUT IN CENTER, LOCATED AT BELLEVUE, LANDES, FRANCE

We had not been in France long before this necessity for lumber faced us in terrible earnestness. Our Army engineers had always found at hand whatever materials they needed, and they drew up elaborate plans accordingly. The Chief of Engineers of the A. E. F. called in Colonel Graves and made him responsible for furnishing the lumber to carry out these plans. Accordingly Colonel Graves and I went to work to procure it. We knew that the tonnage shortage prevented our importing it, but we understood that the French would fill our first requirements.

What was our dismay to learn that by furnishing us lumber the French had simply meant they would furnish us the trees standing in the forests. They had no piles, and they had not enough lumber or ties for themselves. Even worse, they had no labor. What were we to do? The situation was critical. Our troops were on their way over, and we had nothing built to receive them, nor any materials with which to build. We must have forestry troops and sawmills at once. Mr. Claville, the

British army and the American army as well? The construction program of the American engineers called for lumber in quantities which staggered the French.

Fortunately, France did have the forests. The situation was saved, the war shortened by many long months. And why did she have them? Because she had practiced forestry for generations.

We must not imagine that she always practiced forestry. Like other countries, she began by destroying her forests. Eventually, however, she saw the disastrous effects of her recklessness, and gradually turned from destroying to restoring, and then to building up. For example, 100 years ago the southwestern corner of France, extending from Bordeaux to the Pyrenees Mountains, was almost as treeless as the prairie, and was fringed by sand dunes which were constantly in movement, burying fields and houses and even whole villages. Napoleon called in engineers and foresters. These men succeeded in holding the dunes in place by planting with maritime pine; and then they planted up

the whole interior of the region with the same tree. During the war this region was the largest source of lumber, not only for the French army, but for the British and American armies as well.

The French forests were, therefore, not simply nature's gift, but the fruit of conscious effort, applied with painstaking care and industry through long years.

Forestry to a Frenchman is the accepted way of handling forests. He cannot conceive of handling woodlands

timber that was ready to be cut, and even to sacrifice that which they would not normally have cut for ten or fifteen years. But they were firm against annihilating any forest, or cutting it in such a way that it could not recover with reasonable care. They, therefore, maintained absolute control over the methods of cutting. On the government owned forests, they were particularly strict, marking every tree to be cut and prescribing in detail the methods of brush disposal, etc. On private



THE OFFICERS' ROW AT BELLEVUE CAMP, LANDES, FRANCE, THE FIRST CAMP OF THE AMERICAN FORESTERS AND LUMBERJACKS

in any other way. In France everybody, even those who are not foresters or lumbermen, understands what forestry means. When you say you are a forester you don't have to stop and explain as you do in America. It is just as clear as if you said you were a lawyer or a doctor. This universal understanding of the aims of forestry is the most potent factor in the upbuilding of the forest resources of any country. It is to the interest of the lumberman to have a perpetual supply of timber to cut; it is to the interest of the wood using industries to have a permanent source of raw material; and it is to the interest of the country as a whole to be independent of outside sources of supply.

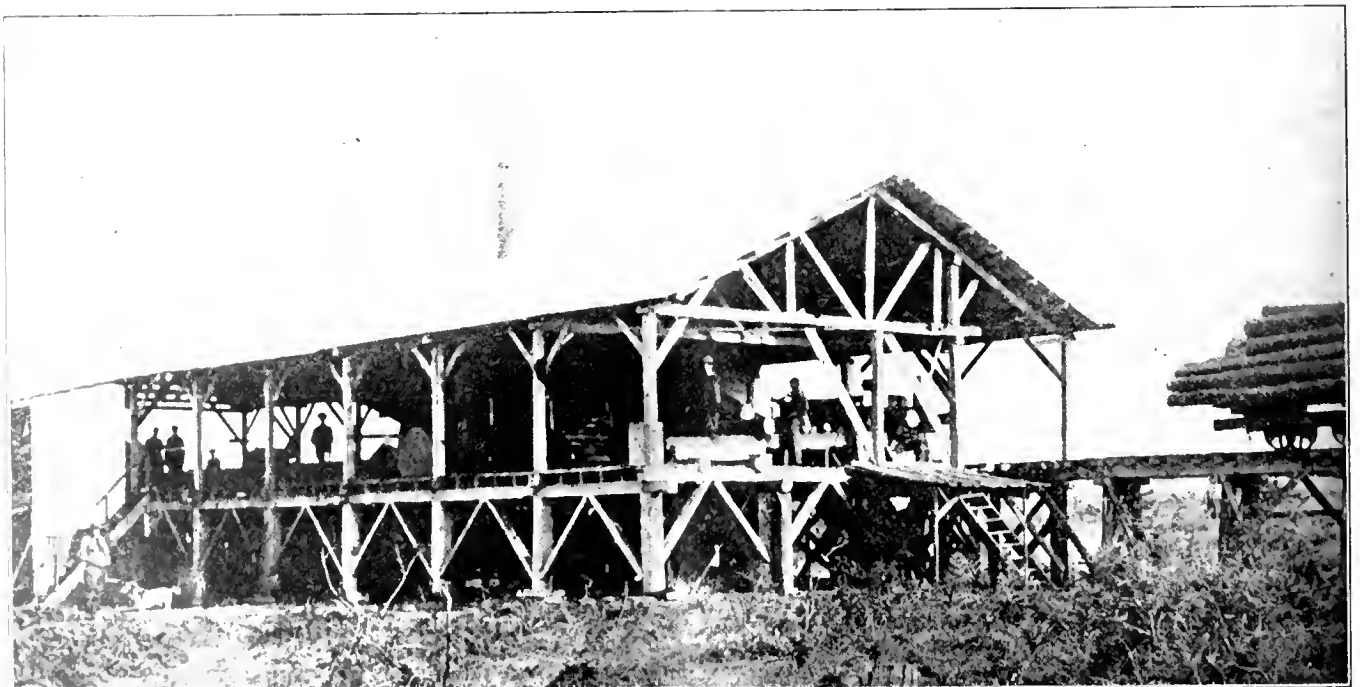
No wonder, then, that the French valued their forests, and were unwilling to have them needlessly destroyed. They did not forget the years of toil they had spent in creating them. They were willing to give up all the

lands the owner marked or designated in the contract those trees which he would sell. He also laid down the manner of brush disposal and other operations. Ultimate control was vested in a committee composed of representatives selected by the Minister of Agriculture, the Minister of Munitions as well as all other interested members of the cabinet, and representatives of the lumber industry. Under these conditions we had little choice as to methods of cuttings.

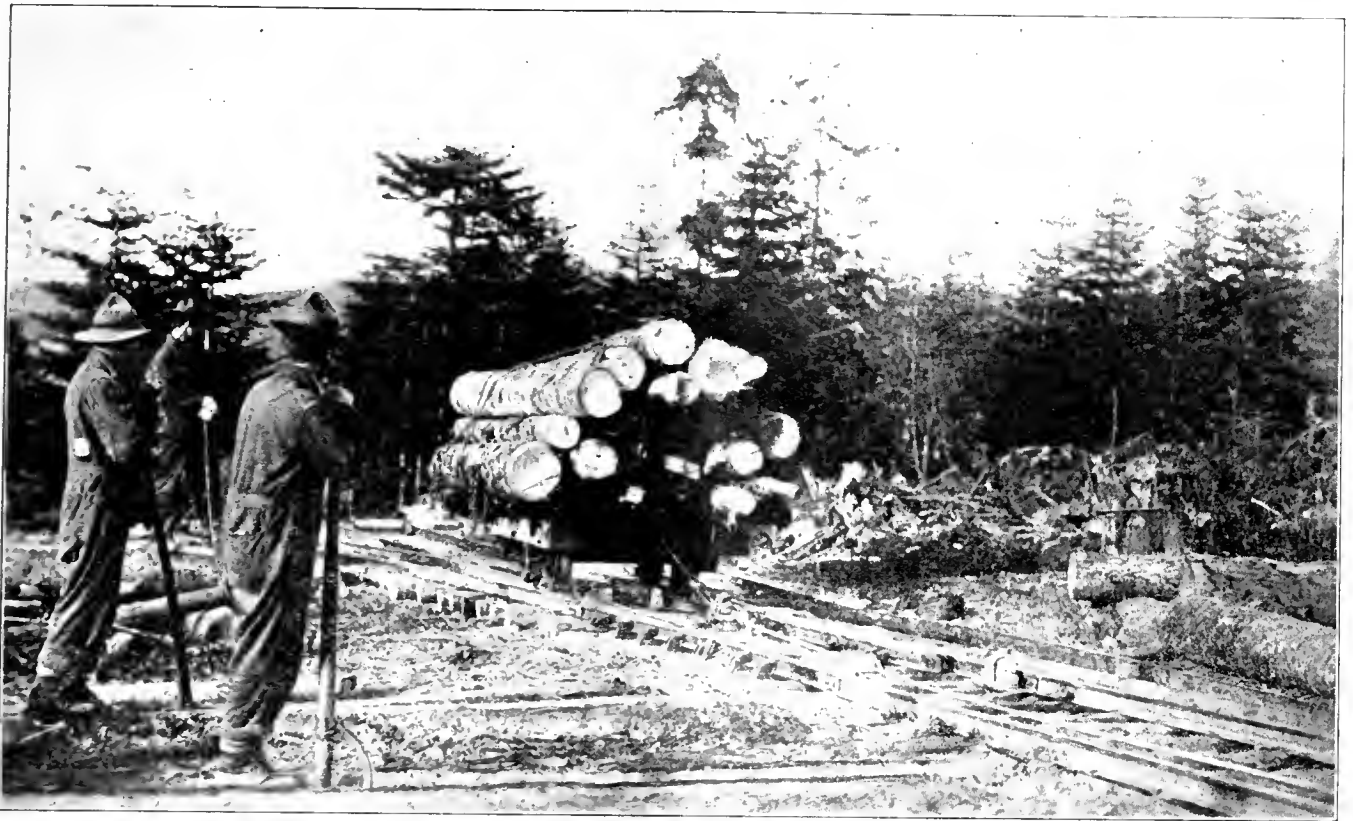
The operations were uniformly well carried out. The stumps were cut so low you could hardly see them; the tops were chopped into cordwood, and the slash thoroughly cleaned up. The cutting areas of the Canadians and Americans were generally better than those of the French wood merchants themselves. This goes to show that the lumberman can cut under forestry methods when he has to. He can do it even when subjected to the



LOAD OF HARDWOOD LOGS ON A WHITE TRUCK ON THE WAY TO ONE OF THE SAWMILLS OF THE 20th ENGINEERS



A 20 M AMERICAN SAWMILL OF THE 20th ENGINEERS. SOME OF THESE MILLS WORKED NIGHT AND DAY TO SUPPLY THE DEMANDS OF THE A. E. F. FOR LUMBER



LOAD OF LOGS WHICH HAS JUST BEEN LOWERED DOWN A STEEP INCLINE. THE CABLE BY WHICH THE CAR OF LOGS HAS BEEN LOWERED IS SEEN BETWEEN THE RAILS AT THE RIGHT.



INTERIOR OF 20th ENGINEERS SAWMILL IN FRANCE



CAMP OF A DETACHMENT OF THE 20th ENGINEERS IN SOUTHWESTERN FRANCE, SHOWING OLD STYLE FRENCH FARMHOUSE IN THE BACKGROUND

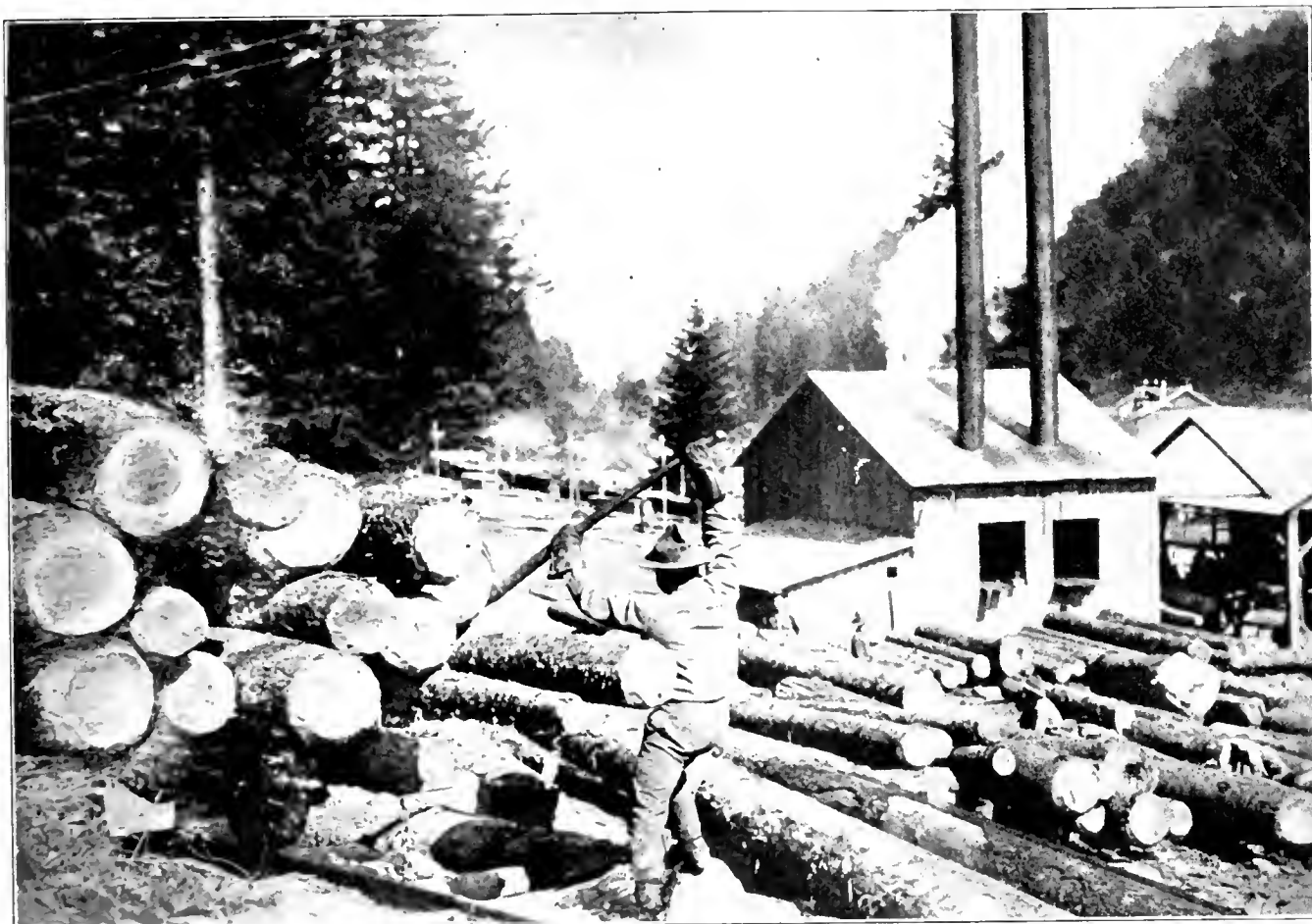
greatest imaginable pressure for quick production; and what is more, he does it well.

The organization of the American forestry section was patterned largely after that of the Canadian Forestry Corps. When Colonel Graves and I landed in France in June, 1917, we went first of all to the British Forestry Directorate at LaTouquet. Gen. Lord Lovat received us with the greatest friendliness, and gave us complete data which he had prepared in advance, covering his entire organization and equipment. Then, after a trip to the Canadian operations under Colonel Johnson on the government forest of LaJoux, in Eastern France, and after working over the information collected, we drew up a cable outlining the organization of the forestry troops required by the A. E. F. We based our requirements on an army of two million men, and asked for 18,000 forestry troops, of which 7,500 were to be skilled lumbermen, about 4,500 engineer troops for road and camp construction, and about 6,000 unskilled labor. At the same time we requested twelve officers to come over at once for overhead organization. These officers we asked for by name. They arrived in about two months, in time to be of great service in acquiring standing timber and other preparatory work. The unit of the Canadian Forestry Corps is the company. We made ours the battalion on account of our army regulations; it was hard at first to make our superiors see the need for elasticity. Forestry troops were an entirely new venture. The number of men in the actual operations depended entirely upon the needs of the case. Sometimes only 50 men would work together, and then again, we would have a thousand or more.

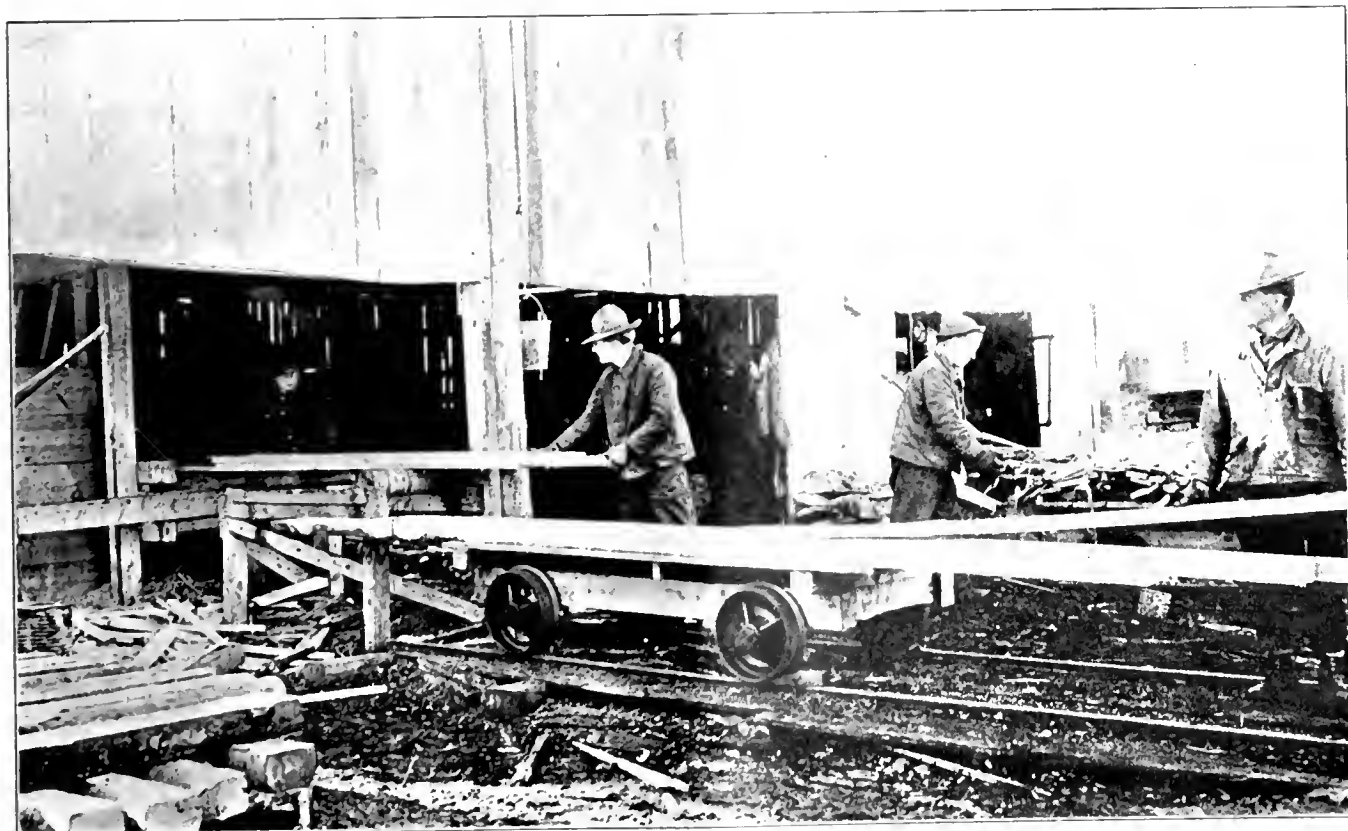
The standing timber was all bought through an inter-allied committee composed of French, British and Americans; later the Belgians were represented. We ourselves selected each forest, in company with a French officer, and then laid it before the committee. The negotiations with the owner, and purchaser, were done by the French. The French possessed the right of requisition, and used it effectively, saving millions of dollars and defeating the swarms of speculators which buzzed around us like flies around the honey pot. By persistent efforts we managed to acquire timber enough to keep ahead of the operations. But toward the end it was becoming more and more difficult to find reasonably accessible tracts. Accessibility was of prime importance in selecting timber, because of the need for rapid production. If the war had lasted, we would have been in a difficult position. When it ended, we were planning to do railroad logging in the mountains.

Logging conditions varied greatly. The southwestern pineries are as level as a table, except for the dunes along the edge. Central France is level or rolling, the chief obstacle being the heavy, sticky clay. Here the forests were mostly oak, which we cut into ties and road plank. The silver fir forests of Eastern France were in the mountains. Our chief trouble there was the narrow gauge railroads, which never had enough cars or engines. The same kind of narrow gauge railroads bothered us in other regions as well.

Last autumn, before the armistice was signed, our War Department planned to have four and a half million men in France by July, 1919. This meant an enormous increase in the lumber requirement. To meet it, we planned



UNLOADING LOGS FROM RAILWAY CAR AT AN AMERICAN SAWMILL



REMOVING LUMBER FROM TAIL END OF AMERICAN SAWMILL

to bring over 24,000 additional forestry troops, or a total of 42,000 men, 2,000 of which were to cut for the French and British. The men were already being recruited when hostilities ceased. Whether or not France could have furnished the timber for this force, as well as for the British and French armies, is difficult to say. Certainly we would have been hard put to it, and been compelled to operate some very difficult tracts.

We had to get ready cut lumber, ties, and piles for immediate needs pending the arrival of the forestry troops. We had to continue getting this class of material even after the arrival of the forestry troops, because the War Department increased the numbers of fighting men beyond what we had anticipated when we drew up the organization of the Forestry Section. The British and French helped us in this with wonderful generosity, giving us material from stocks sorely needed for their own armies. We developed to their utmost all European sources, Switzerland, Portugal, and even Spain. This

was so great that England cut down her importations of food to get tonnage to bring men over. The people went without sugar, they went without butter and other fats, they had almost no meat and a miserly slice of bread each day. They reduced themselves to the verge of starvation just to get a few more ships to bring soldiers to France. Had it not been for the forests of France, these ships, yes and even more ships, would have had to bring lumber instead of men.

We have seen, then, that wood is a military necessity, and that, owing to the shortage of ships, we could not have sent the necessary men and guns to France if there had not been the French forests to supply the wood. We have also seen that these forests are due to the efforts and industry of skilled foresters backed by the people.

In concluding, I wish to take this opportunity of expressing my profound admiration of the Canadian Forestry Corps, and deep appreciation of their generous and unfailing assistance. A finer lot of men I never hope



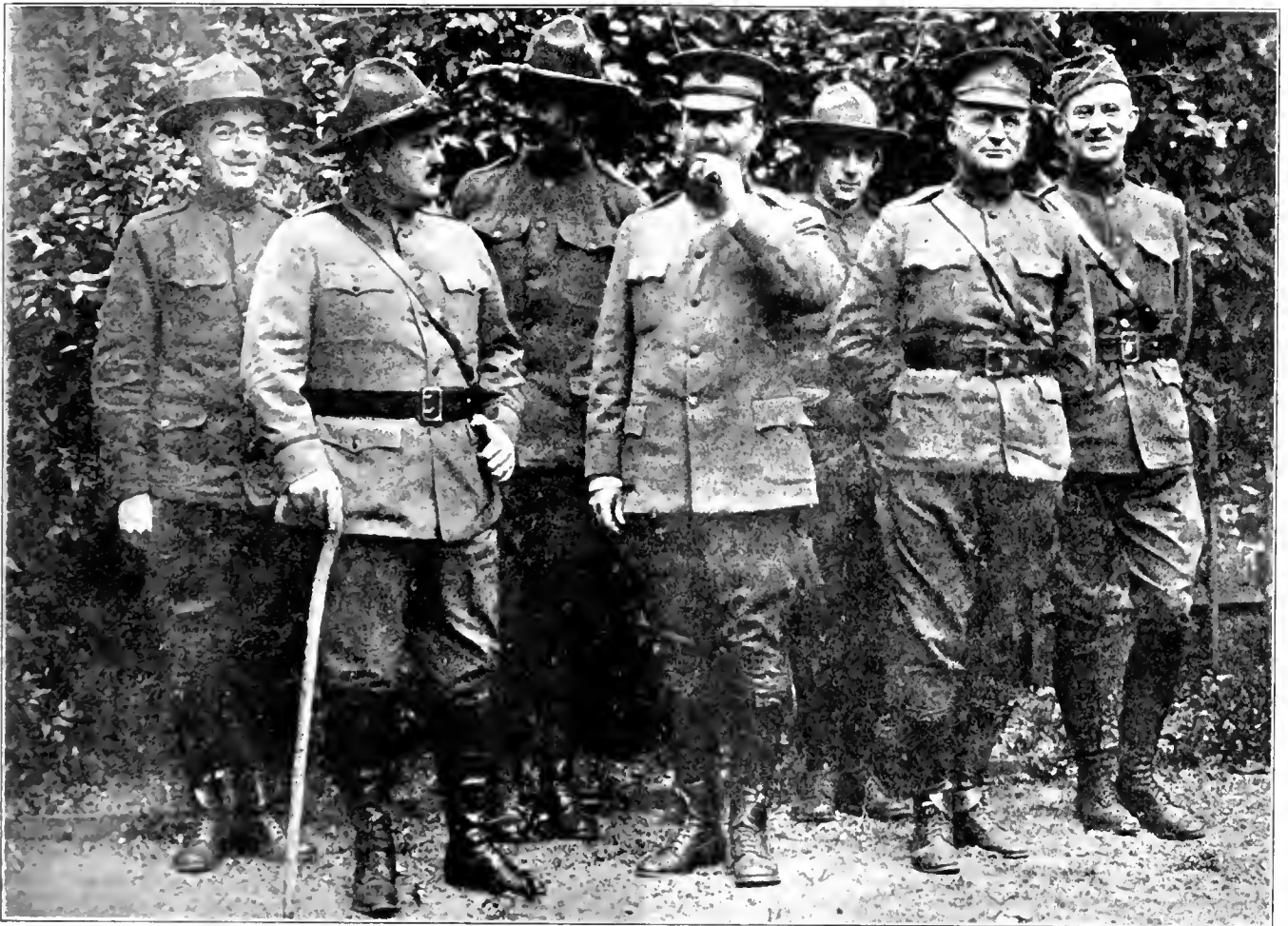
GENERAL VIEW OF ONE OF THE 20th REGIMENT SAWMILLS

last was the work with which I personally was most concerned after the arrival of the forestry troops.

When we consider that the modern army is helpless without wood, I think it is safe to say that the French forests were one of the big factors in winning the war.

Had not the standing timber been in France to cut, it would have been useless to send forestry troops, and we would have been compelled to use precious tonnage in bringing the wood to our armies. We all know how critical the situation was during the German drives from March to July. Every man and every gun was needed. The drive in March was checked by a handful of men who had never fought before, laborers, camp cooks, any one who could hold a rifle. The need of men and guns

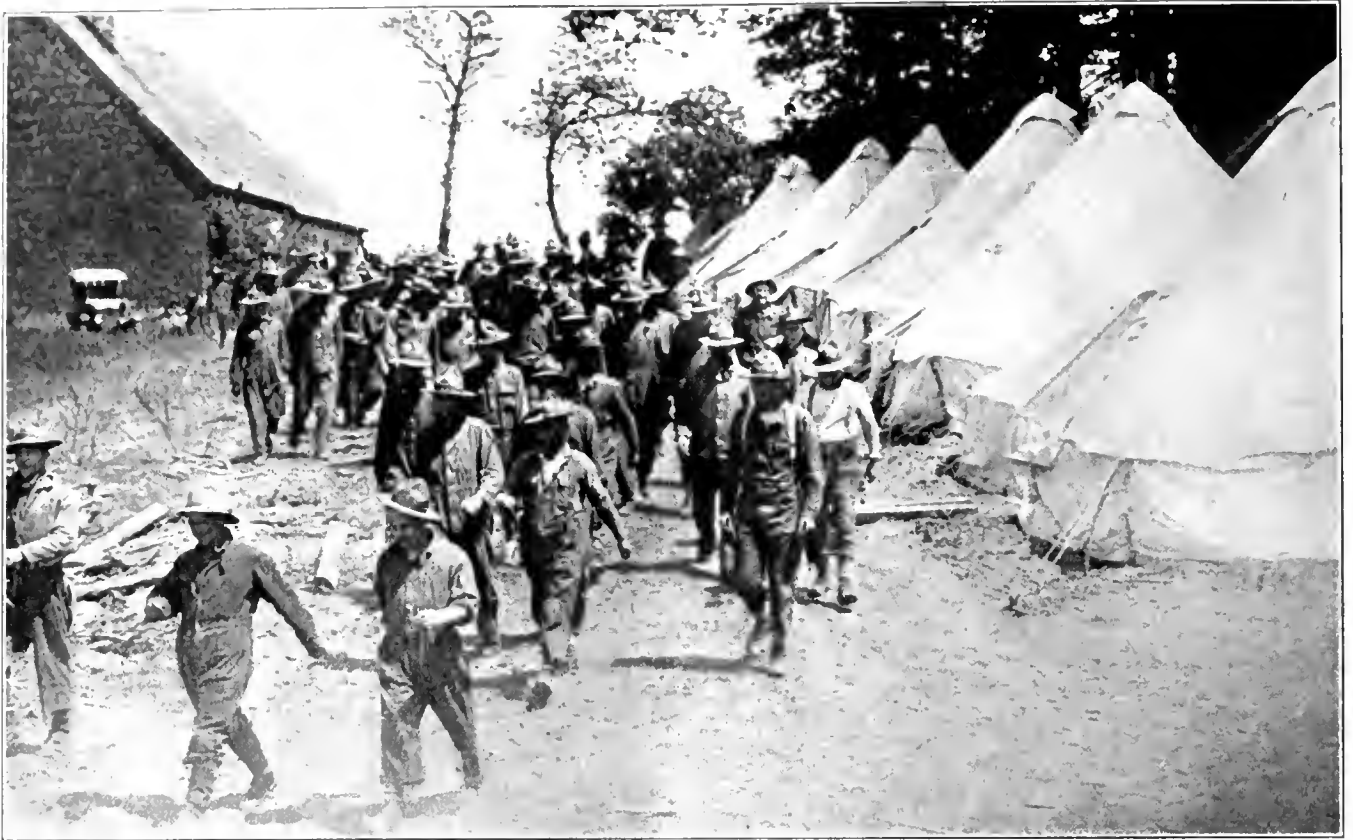
to meet. When Colonel Graves and I landed in Bordeaux in June, 1917, wholly ignorant of what lay before us, Colonel Miller, in charge of the Canadians in the region, called upon us and not only extended to us every courtesy but gave us much valuable information. I have already spoken of the assistance we received in drawing up our organization. Colonel White was particularly helpful with friendly counsel. When our forestry troops had arrived but were unable to commence sawing because our mills had not yet come, General MacDougal lent us five Canadian sawmills, three of 20,000-foot and two of 10,000-foot capacity, with full equipment. I feel that I speak for all the American lumbermen and foresters in France when I say that we can never adequately repay our debt of gratitude to the Canadians.



A GROUP OF OFFICERS OF THE 20th ENGINEERS (FORESTRY) IN FRANCE



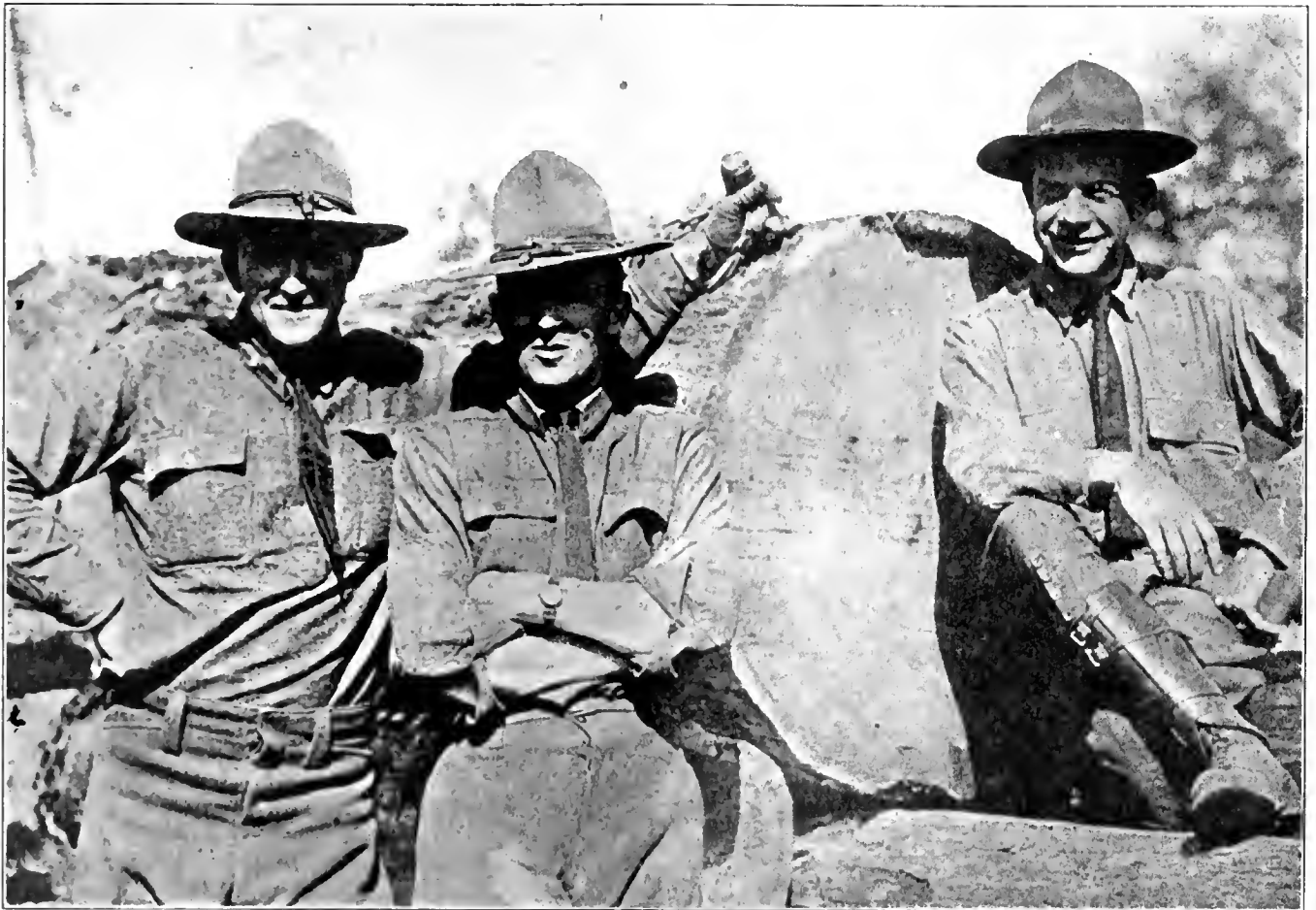
CAMP OF A DETACHMENT OF THE 20th ENGINEERS (FORESTRY) IN CENTRAL FRANCE



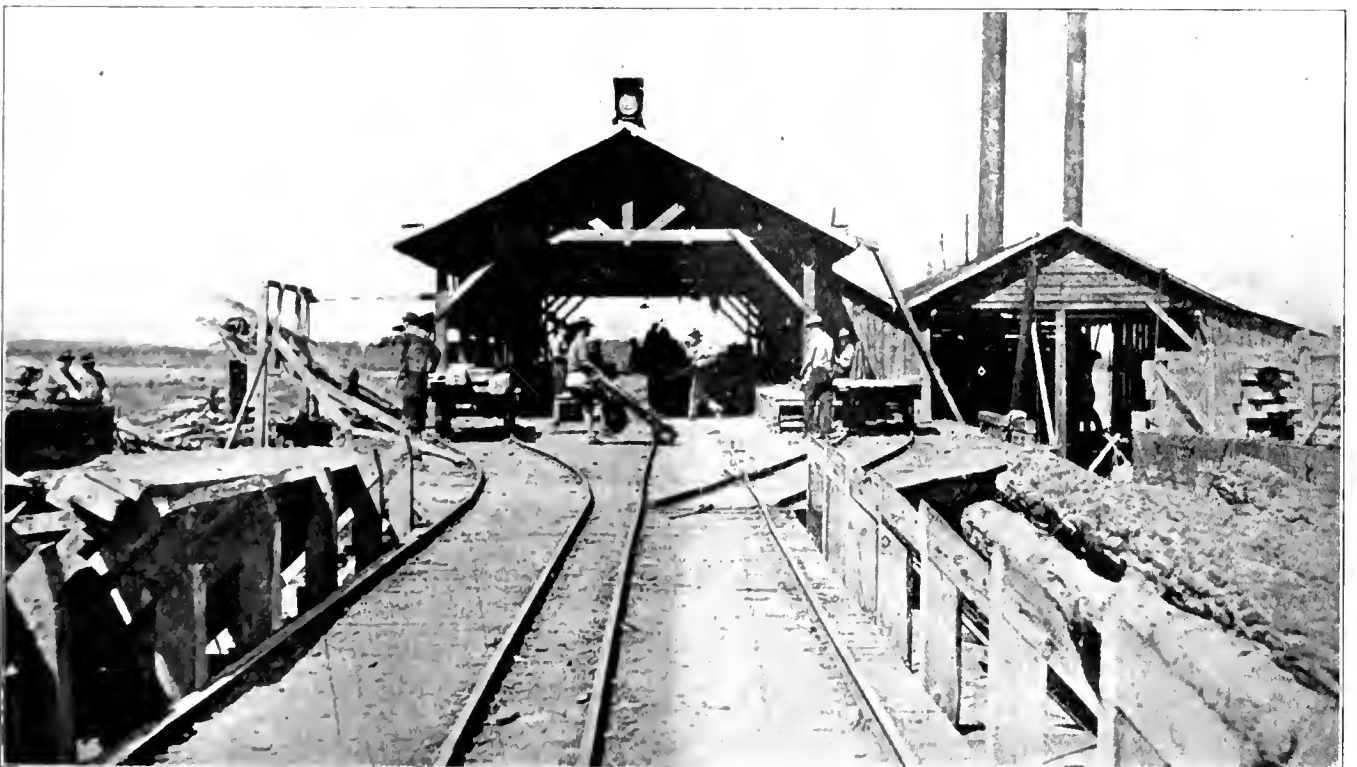
CAMP OF DETACHMENT OF 20th ENGINEERS IN FRANCE. CREW STARTING TO WORK



20th ENGINEERS IN FRANCE HAULING A SPRUCE TREE FULL LENGTH BY MEANS OF BIG WHEELS FROM WOODS TO MILL. OAK COPPICE AT THE SIDES OF THE ROAD.



OFFICERS OF THE 20th REGIMENT POSING FOR THEIR PHOTOGRAPHS AT A LUMBER CAMP IN FRANCE *



THE AUREILHAN 20-M AMERICAN SAWMILL NEAR PONTENX, LANDES, FRANCE, SHOWING THE SYSTEM OF TRACKS UPON WHICH THE TIMBER AND LUMBER ARE REMOVED FROM THE MILL TO BE LOADED DIRECT TO THE BROAD GAUGE RAILWAY CARS



AMERICAN FORESTRY TROOPS CUTTING SPRUCE TREES IN A PARK IN FRANCE



A LOADED AMERICAN LOG WAGON ON ITS WAY FROM THE FOREST IN FRANCE TO A 20th REGIMENT SAWMILL



HAULING LOGS BY HORSE POWER FROM THE WOODS TO ONE OF THE 20th REGIMENT SAWMILLS IN FRANCE



LUMBER YARD AT THE BOURICOS AMERICAN 20-M SAWMILL NEAR PONTENX, LANDES. MARITIME PINE FOREST SHADES THE CAMP IN THE BACKGROUND AT THE LEFT



30th ENGINEERS SAWING FELLEED TREES INTO LOGS IN A PINE FOREST, SOUTHERN FRANCE



20th ENGINEERS LOADING FIR LOGS ON NARROW GAUGE RAILWAY CAR IN THE MOUNTAINS OF EASTERN FRANCE



AMERICAN LUMBERJACKS AND FORESTERS LOADING LOGS ON TO AMERICAN LOG WAGON IN CENTRAL FRANCE



20th ENGINEERS LOADING LONG PILING FOR SHIPMENT FROM EASTERN FRANCE TO BASE PORTS ON ATLANTIC COAST TO BE USED IN DOCK CONSTRUCTION



20th ENGINEERS SKIDDING AND PEELING POLES IN A FRENCH PINE FOREST IN SOUTHWESTERN FRANCE



LOADING FOREST PRODUCTS ON TO FRENCH RAILWAY CARS IN THE HARDWOOD FORESTS OF CENTRAL FRANCE



A 20th REGIMENT SAWMILL UNIT CAMPED IN A HARDWOOD FOREST IN CENTRAL FRANCE



LOG BOOM IN AUREILHAN LAKE IN THE LANDES, FRANCE. THE AMERICAN SAWMILL LOCATED AT THIS POINT MADE AN UNUSUALLY GOOD RECORD IN PRODUCTION AND SHIPMENT



BRINGING SPRUCE AND PINE LOGS INTO AMERICAN MILL IN FRANCE. LARGE HEAP OF SAWDUST RIGHT CENTER. SAWDUST SEEN COMING FROM THE BLOWER PIPE



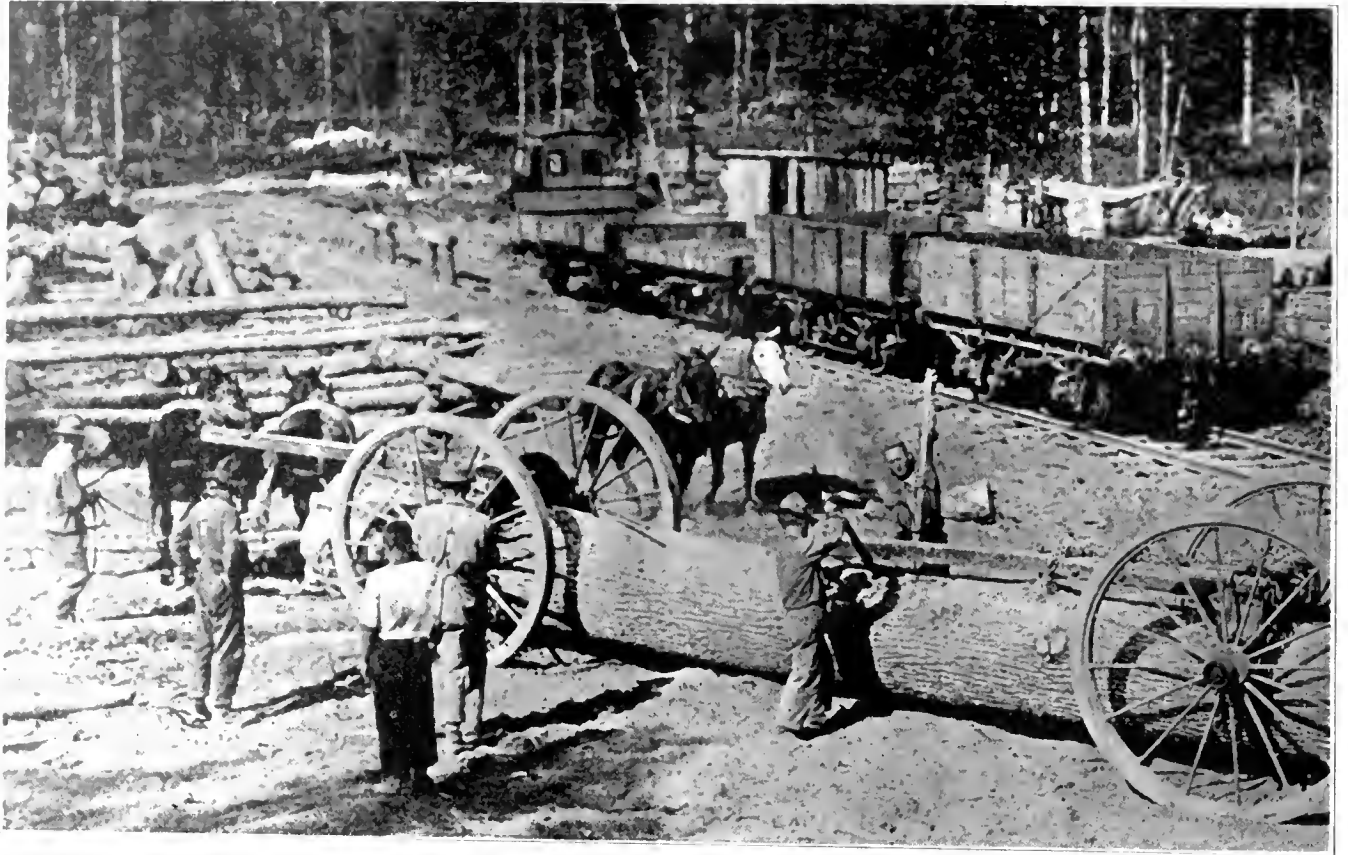
A LARGE LOAD OF MARITIME PINE LOGS ON A MOTOR TRUCK OF THE 20th ENGINEERS (FORESTRY) IN FRANCE



20th ENGINEERS LOADING LUMBER AND TIES ON FRENCH CARS. THE CAR AT THE LEFT IS LOADED WITH BARBED WIRE STAKES. THE BUILDING AT THE END OF THE RIGHT-HAND CAR CORRESPONDS TO AN AMERICAN CABOOSE



TYPE OF WAGON USED BY THE AMERICAN FORESTRY ENGINEERS IN FRANCE. NOTE THE SIZE OF THE LOAD



TWO PAIR OF BIG WHEELS USED TO BRING A LONG HARDWOOD LOG TO A MILL IN CENTRAL FRANCE



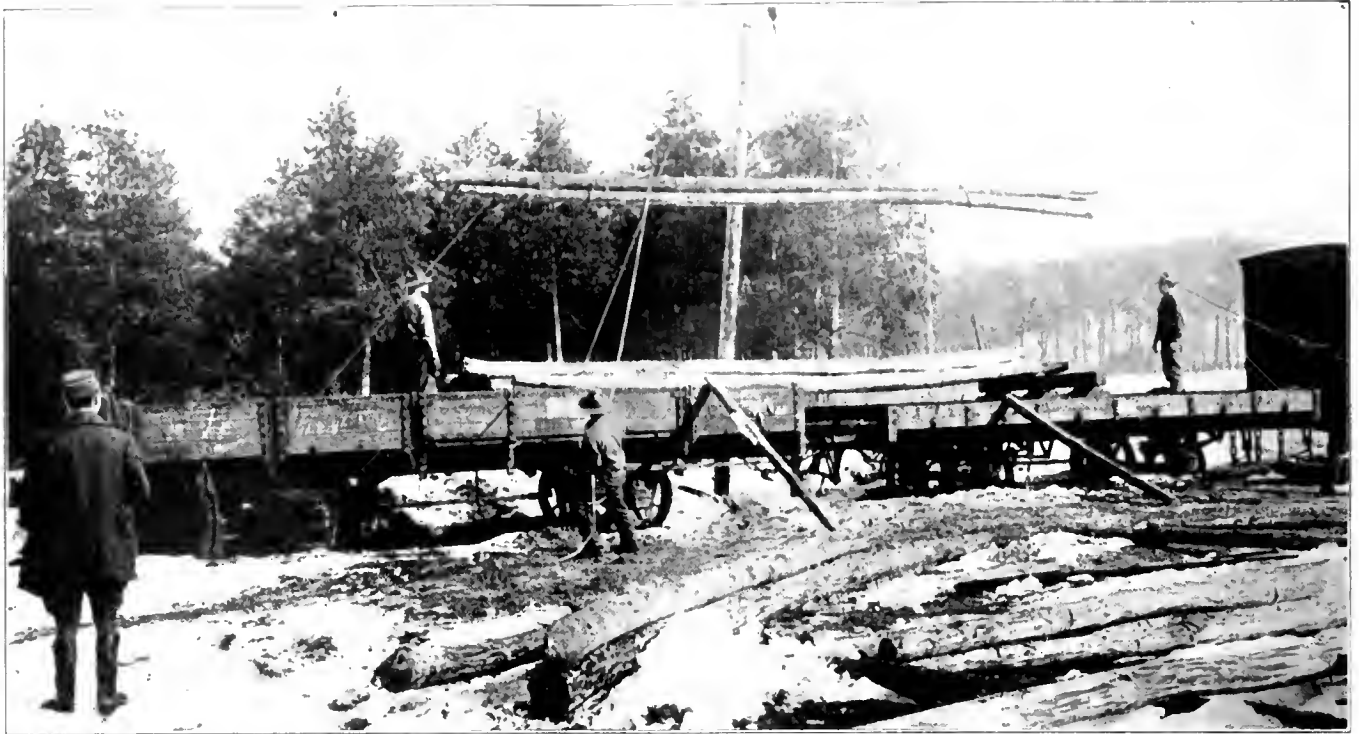
A LARGE SAWMILL OF THE 20th ENGINEERS CUTTING HARDWOOD LOGS IN FRANCE



LOADING SOME OF THE MANY THOUSANDS OF TIES MADE BY THE 20th REGIMENT MILLS FOR THE A. E. F. OPERATIONS IN FRANCE



A LARGE AMERICAN SAWMILL IN A FRENCH HARDWOOD FOREST



LOADING PEELED POLES ON TO RAILWAY CARS AT ONE OF THE OPERATIONS OF THE 20th ENGINEERS



THESE YOUNG LUMBERJACKS ARE THE TYPE OF SKILLED, ENERGETIC WORKERS WHO MADE RECORD PRODUCTION POSSIBLE



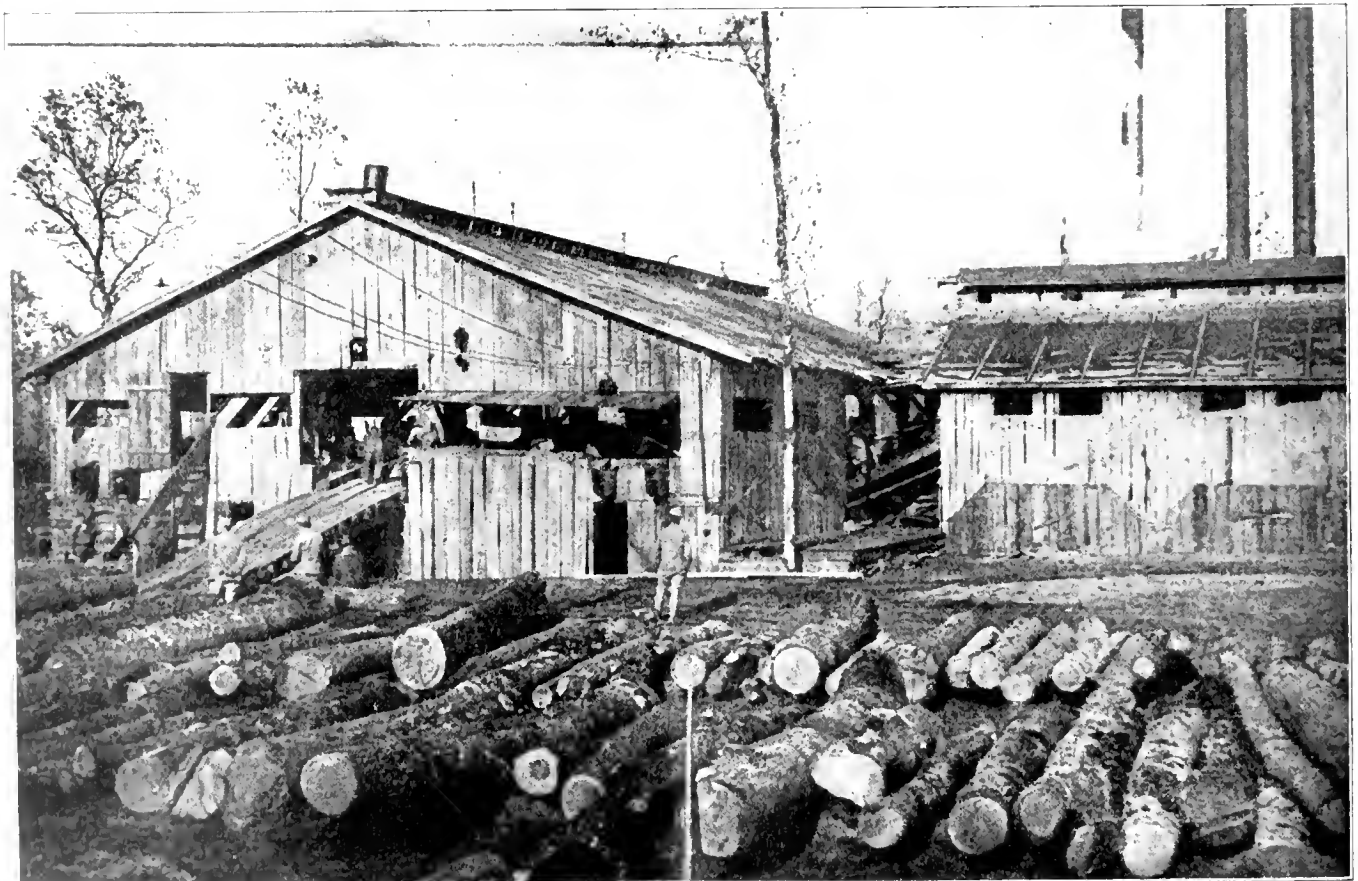
20th ENGINEERS LOADING FIR LOGS IN THE MOUNTAINS OF EASTERN FRANCE



UNLOADING SMALL LOGS AT AN AMEX MILL IN CENTRAL FRANCE. NOTE THE SPOUT THROUGH WHICH THE SAWDUST IS BLOWN TO LARGE SAWDUST PILE AT THE LEFT



MEMBERS OF THE 20th ENGINEERS LOADING PILING ON TRUCKS AT LANDING No. 2 IN FRANCE. THESE PILING ARE APPROXIMATELY SEVENTY FEET LONG



THIS WAS ERECTED BY THE 20th ENGINEERS NEAR ST. DIZIER AND SURPRISED THE FRENCH WITH ITS LARGE DAILY PRODUCTION, AS IN FACT DID ALL THE OTHER MILLS

HOW THE AMERICAN ARMY GOT ITS WOOD

BY PERCIVAL SHELDON RIDSDALE

EDITOR OF AMERICAN FORESTRY MAGAZINE

“YOUR part in winning the war has been as important as that of any other troops in the American Expeditionary Forces.”

This was the high commendation given right after the signing of the armistice to the foresters and lumbermen who had gone to France to get out the lumber needed by the American Army. It was contained in a general order issued by Col. J. A. Woodruff, “To the Officers and Soldiers of the 20th Engineers and Attached Service Troops.” Colonel Woodruff was placed in command of the 10th Engineers (Forestry) when that regiment was organized shortly after the United States entered the war; and later of the combined Tenth and Twentieth, Foresters and Lumbermen, when they were united into what constituted the largest regiment the world has ever seen. Its total strength just before hostilities ceased was 360 officers and 18,183 enlisted men, an aggregate of 18,543 men engaged in the production of lumber for the American Army.

General Pershing had scarcely landed in France before he realized that great quantities of lumber were necessary for the army which was preparing to follow. The shortage of shipping at that time due to the submarine campaign made it impossible to ship the lumber from this country. Fortunately, France had the timber, although she did not have the men who could cut it for any forces other than her own. Accordingly, General Pershing sent an urgent cable to the War Department calling for lumberjacks and foresters to constitute a force of trained men who could get out an immense monthly supply. He said in effect that it would be useless to send fighting men unless they could be supplied with lumber and that forestry troops should be sent first. Docks, warehouses and railroads had to be built, and wood was needed for a hundred other purposes.

The War Department, therefore requested the Forest Service to assist in the formation of a forest regiment. This was the beginning of the 10th Engineers, composed

of two battalions of three companies each, which it was thought at first would be sufficient for the purpose. Plans for the organization of this regiment began in the early summer of 1917, shortly after the United States entered the war. Trained foresters and lumbermen were gathered from all parts of the country. Through its district representatives, the Forest Service was able to reach the operators and the lumber companies, the sawmill owners and the loggers, who had men skilled in all branches of the profession. Graduates and students of the forestry schools enlisted. These men came to the

American University Camp which was established at Washington, District of Columbia, in the midsummer of 1917; and in the beginning of September were on their way to the other side. They arrived in France in the early days of October, and were all at their assignments by the first of November.

In the meantime plans for sending over a much larger army than had been anticipated and for shipping the troops with the greatest possible speed, necessitated the formation of another forest regiment. This was the 20th Engineers, the first two battalions of which were ready to proceed to France early in November, while the others kept following as fast as they were organized until March, 1918. Another regiment was being formed

at the time Germany quit. The 20th Engineers was commanded by Col. W. A. Mitchell, like Colonel Woodruff, a regular army officer and a West Point graduate, whose previous services fitted him admirably for this work. Colonel Mitchell later was transferred to the 2d Engineers, known at the front as the “Fighting Engineers,” and was cited for bravery. When the 10th Engineers and the 20th Engineers were combined into one regiment, Colonel Woodruff took command of the united force.

The American foresters and lumbermen knew that they had their work cut out for them when they arrived in France, but they were impatient to get on the job. Originally it was figured that they would have to get



LIEUT. COL. GRAVES IN FRANCE

The Chief Forester of the United States went abroad shortly after this country entered the war to organize the work the American foresters were to do in helping to get out the timber needed for war purposes.

out about 25,000,000 feet of material a month; but these figures kept mounting until in September, 1918, they turned out 42,000,000 board feet, while for the six months ending with March, 1919, in preparation for the big spring drive which would have started then if the war had not ended when it did, the schedule called for a stupendous total of 450,000,000 feet of lumber for the American Army.

When the 10th Engineers was formed it was the first time a United States army had organized and equipped troops for systematic forest engineering. Immediately after the need became known, Henry S. Graves, Chief Forester of the United States, with the rank of major in the Reserve Engineer Corps, went to France to prepare for the forestry work there and to make arrangements for the acquisition of cutting rights in the French forests. Later Major Graves was commissioned a lieutenant colonel. With him went Capt. (later Major) Barrington Moore. They landed in France in June, 1917; and before Colonel Graves left France in January, 1918, the 10th Regiment and a considerable

portion of the 20th Regiment also had arrived and were producing wood and lumber for the American Army.

Two months after Colonel Graves reached France he was followed by Wm. B. Greeley, Assistant Forester, United States Forest Service, who had been commissioned a major on the regimental staff of the 10th Engineers in this country, but who was needed to take charge of organization work in France. Later he was promoted to the rank of lieutenant colonel and made chief of the entire forestry section under Colonel Woodruff, and in April, 1919, was decorated by the French with the Legion of Honor. Colonel Greeley was accompanied by two officers, First Lieutenants Stanley L. Wolfe and Clarence E. Dunston, and nine civilians, all of whom later were commissioned. These men were Theodore S. Woolsey, Jr., Donald Bruce, Swift Berry, R. Clifford Hall, Ralph C. Staebner, Fred B. Agee, William H. Gibbons, Joseph Kittredge and W. H. Gallagher.

Major Woolsey, who was in April, 1919, made a lieutenant colonel, became a member of the executive com-



COL. W. A. MITCHELL, U. S. A.

First Commander of the 20th Engineers, who, upon his arrival in France, was transferred to the 2nd Engineers.



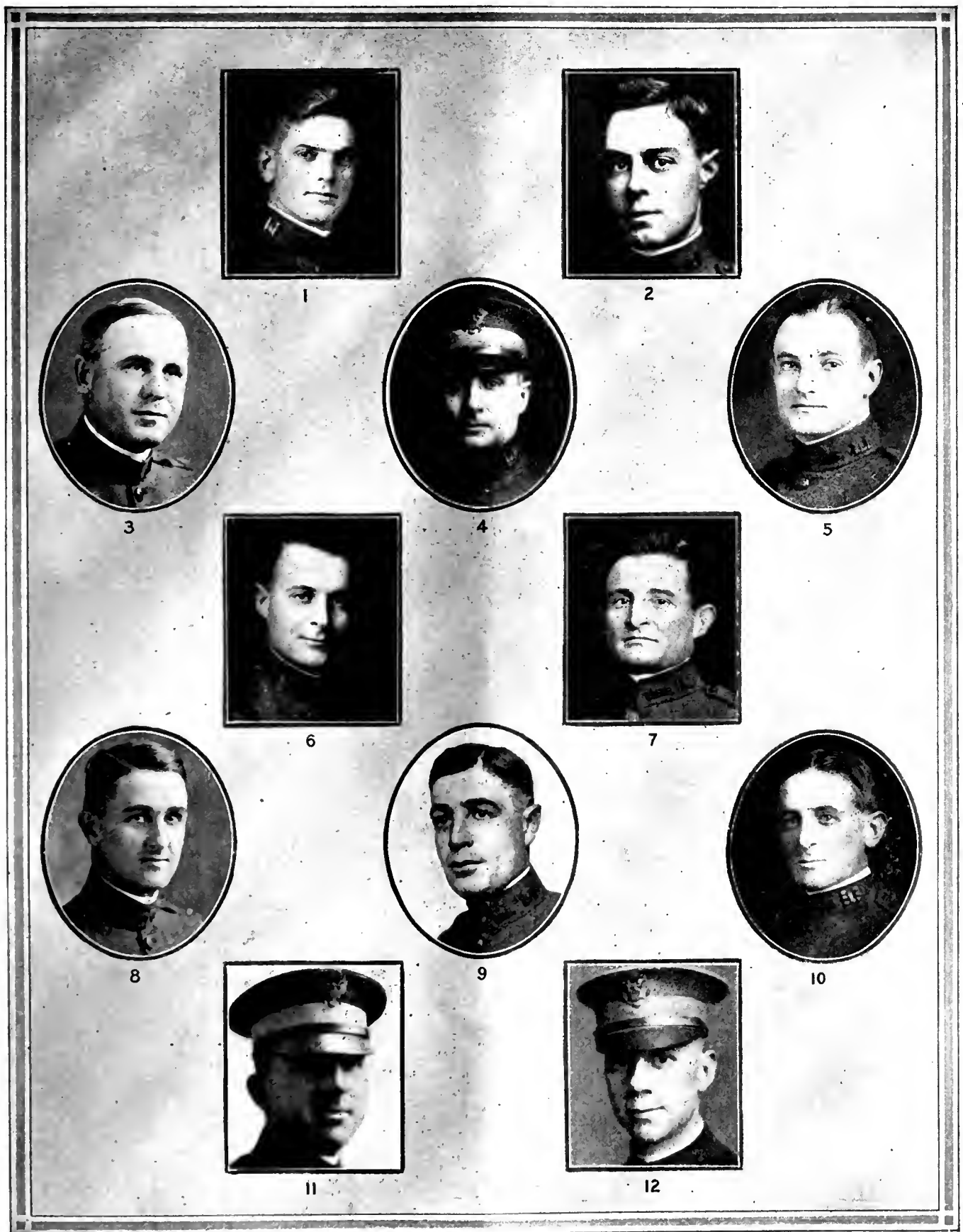
MAJOR S. O. JOHNSON
20th Engineers



MAJOR JAMES E. LONG
20th Engineers



THE LATE MAJOR E. E. HARTWICK
20th Engineers



Photograph by Harris and Ewing

AMERICAN FORESTRY'S PORTRAIT GALLERY OF OFFICERS OF THE TWENTIETH ENGINEERS (FORESTRY)

1. 1st Lt. Paul D. Mackie. 2. 1st Lt. Lester W. Jacobs. 3. Major Collin E. Clark. 4. Capt. F. R. Barnes. 5. Capt. Ralph H. Faulkner.
 6. Capt. George G. Steel. 7. 1st Lt. Milton Pittman. 8. 2nd Lt. Harry G. Miller. 9. 1st Lt. Frederick B. Judge. 10. 1st Lt. Gilbert C. Eastman.
 11. 2nd Lt. Fred A. Roemer. 12. 2nd Lt. Julius A. Herbott.

mittee of the Comite Interallie de Bois de Guerre, which was organized before Colonel Graves returned from France to avoid competition among the British, French and American armies in the purchase of timberland. Captain Bruce and Captain Kittredge served under Lieutenant Colonel Peck in the fuelwood project in the advance section. Capt. R. Clifford Hall served under



MAJOR P. E. HINKLEY
Commanding 10th Battalion, 20th Engineers

20th Regiments any special training in forestry or lumbering methods before they left the United States, for they were picked men, chosen because of their proficiency in their special work, while the clerical force was selected because of their actual knowledge of keeping lumber accounts and similar information. So during their stay at American University Camp the men were given what military drill was required for administrative and disciplinary purposes. Colonel Graves reports one of the men to have remarked after they got to the other side: "We're not much on drill, but we're hell on cutting down trees." After they landed in France a large part of their actual military equipment was left behind at the various supply stations. As a rule they took with them to their camps about one-tenth of their guns.

The 1st and 2d Battalions of the 20th Engineers, under command of Major Hartwick, of Detroit, and Major S. O. Johnson, of California, sailed in December, 1917; the 3d and 4th, under command of Major R. A. Johnson, California, and Major George H. Kelly, Oregon, sailed the first week in January, 1918; and the other battalions followed at approximately three-week intervals, with Major Frederick Kellogg, New York, in command of the 5th; Major Benjamin F. Wade, of New Jersey, the 6th; Major C. E. Clark, of North Carolina, the 7th; Major George W. Weisel, of Montana, the 8th; Major

Major Woolsey, and the other men named also held important posts.

It was not necessary to give the men of the 10th and



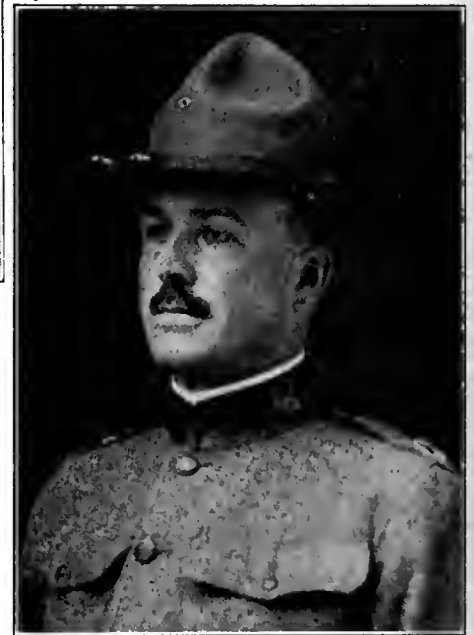
MAJOR F. M. BARTELME
Commanding 14th Battalion, 20th Engineers

F. R. Barnes, of Missouri, the 9th; and Major P. E. Hinckley, of Maine, the 10th.

"We are here, and mighty darned glad that we are; we are busy as beavers, and are going to do our bit and then some in this war." This is what Capt. John D. Guthrie, of the 20th Regiment, Engineers, wrote home shortly after his arrival in France.

That was the spirit which pervaded the entire regiment of foresters and lumbermen. Their only complaint was that they could not get into the actual fighting. Every one of the more than 18,000 who were in the regiment at the time the armistice was signed had been anxious to get to the front. Any one of them would have jumped at the chance any time it had been offered. Some of them came very near getting there shortly after the big spring drive of the Germans began in 1918. Plans were on foot to mobilize every available man in the Service of Supply for service at the front, but the crisis passed without making this action necessary.

The fact, however, that they did not get into the active military end of the game does not detract in the least from the invaluable service they rendered. In the highest sense it was of the greatest military importance, for the army could not have moved forward or maintained



COL. H. L. BOWLBY
Former Regimental Adjutant, 20th Engineers

itself without the endless streams of lumber which were turned out. It is almost impossible to exaggerate the value of wood supplies as a factor in military operations.

In the general order which he issued after the signing of the armistice, Col. Woodruff, after declaring that the army at that time was "well supplied with lumber," added:

"When ties were called for in large quantities to support the advances of our troops at St. Mihiel and in the Argonne, they were ready. At practically every dock project, deliveries of piling and lumber were well ahead

of the construction. In other words, the Forestry Troops have made good on the work for which they were brought to France."

When these men left for France their friends knew they would make good. With what a vengeance they would fulfill these expectations and what remarkable records they would make in spite of countless and constant handicaps, could hardly have been dreamed of in advance. But these stalwart sons of America, hardy woodsmen and sturdy sawmill operators, went into the fight with the same grim determination that inspired their fellows at Belleau Wood and Chateau Thierry, at St. Mihiel and in the Argonne. They wanted to go to the front but could not. But they failed in no task that was assigned to them; in fact, they did more than was asked of them and smashed record after record in their keen rivalry to help crush armed autocracy. They put up a winning fight which will stand among the brilliant achievements of the war on the pages of history.

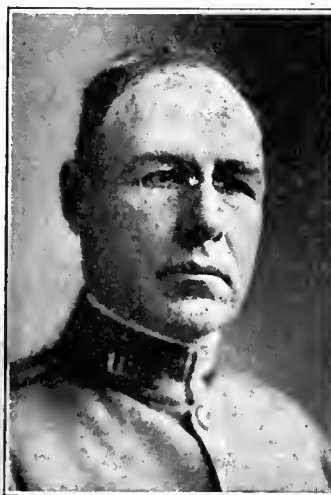
Both with the French mills, old-fashioned and man-driven, which they were compelled to operate when they first arrived, and to some extent even up to the end, and with the modern American mills which arrived later, the lumbermen began from the day of their first cutting to hang up one record after another with patriotic regularity. Mills which were rated at 10,000-foot capacity in a ten-hour day were sent throbbing ahead full speed and made to turn out 25,000 and 30,000 feet a day, with shifts working night and day in most instances. One 20,000-foot mill made the

location was sawing logs in the new section of woodland. Five days had been allowed as a reasonable time for moving this mill. Such feats were not rare occurrences, and similar ingenuity and ability to meet emergencies were shown by the forest regiment many times during its stay in France.

These men had gone over to France for a purpose and they were not to be stopped by difficulties and obstacles. If they did not find the facilities which they needed at hand, they turned in and manufactured them from whatever material was available. In the early days particularly they had to



LT. COL. C. S. CHAPMAN



MAJOR B. F. WADE



MAJOR A. W. CORKINS



MAJOR E. H. MARKS

high-water mark of the war when the 27th Company in 23 hours and 35 minutes cut 177,486 feet of lumber.

It was not only in production but in many other ways that the men of the 20th showed their prowess, their ability to surmount almost insuperable difficulties and to work under conditions which were entirely new to them.

The incident—if such it should be called—might be related of how on one occasion a 10,000-foot mill was moved a distance of twenty-five miles and in forty-seven hours from the time it stopped buzzing in its original

resort to all sorts of ingenious expedients. There was urgent need of supplies for the American army, which was beginning to pour over rapidly. The men of the forest regiment knew this, and they were not going to allow their "buddies" in the infantry and artillery to suffer for lack of barracks and warehouses and hospitals, if there was any way under God's heaven to prevent it. And so American ingenuity was put to the test, and it came out on top. If horses had not yet arrived, the men formed themselves into teams and dragged out the logs by man-power. If the horses arrived before their harness, pieces of burlap and bagging, rope and nails were "composed" into some of the most picturesque harness the world had ever seen. It is probable that the horses themselves had many a chuckle over some of the ludicrous outfits to which they were fitted. Of course, they were too polite to do this before the men, but when they were in their stalls for the night they must have laughed heartily, and probably have carried on a conversation which would have given Kipling fine material for a new animal story.

The officers and men of the forest troops had to improvise in many ways, even to language. Here is what Sergeant Oliver M. Porter, Yale Forest School '15, who was out buying cordwood supplies for the A. E. F., wrote back to the States on that subject. He says: "I hardly know my mother tongue. Speech with me has become an unrecognizable mixture of English, French and Span-

ish, since I have to deal with American soldiers, French civilians and Spanish contract labor. Also I am learning how to talk with my hands, arms, shoulders and feet. Actions speak louder than words, especially where you don't know the words."

Another handicap which the Americans had to overcome was that, being the last on the ground, they had the longest hauls to make. The English forest regiments operated in a comparatively small semi-circle up in the northern part of France; the French in a somewhat wider arc back of this, with Paris as the center; but the Americans had to swing around on a much longer circumference, reaching from the ports of Brest, St. Nazaire and Bordeaux on over through the central southern part of France and up into the Vosges and Argonne section. This called for the building of many miles of railroad, at the Eclaron plant alone, for instance, eight miles of standard gauge and twenty-five miles of two-foot gauge railroad being constructed. The wood cutting did not cease with the signing of the armistice; and up to February 1, 1919, the forest regiment had to its credit 205,000,000 feet of sawed lumber; 2,998,000 standard gauge and 941,000 narrow gauge ties; 1,746,378 pieces of round products; 39,595 pieces of piling and 319,057 cords of fuelwood.

Some of the mills were close to the front, others hundreds of miles away. The mill at Ancemont, to mention one of a number, was operating at the time that town was bombarded; and this mill, which was four or five miles back from the line, was moved to Ippécourt, in the Argonne section. Among other mills close to the front were those at Menil and at La Tour.

One month after the first forestry troops had reached their assignments in France they had three mills in operation, two of them French and one American. This was on December 1, 1917. The first American mill had begun operations on November 27 at Mortumier, near

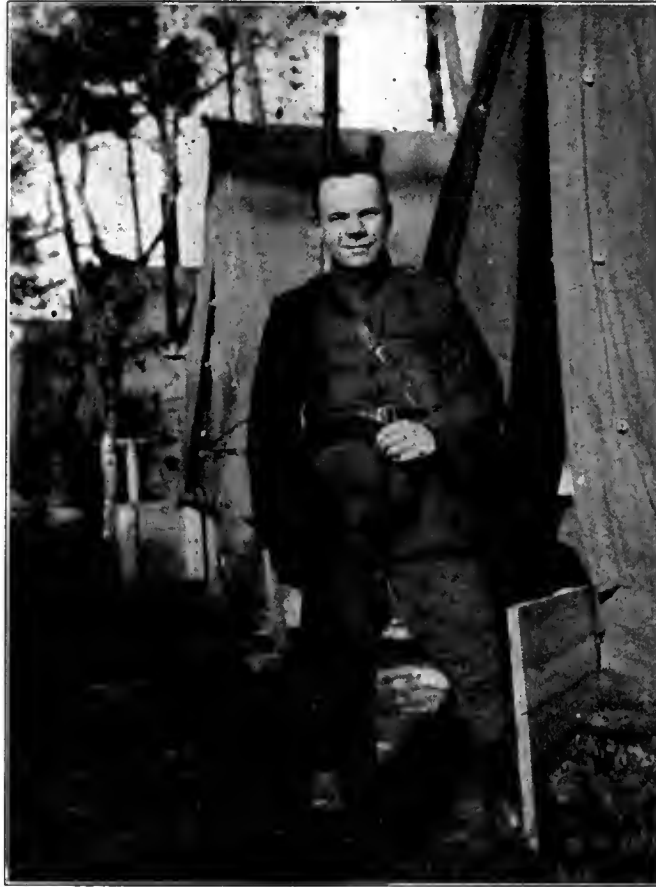
Gien. By the first of January the Americans had ten mills in operation; a month later, twenty-one; by March 1, thirty-four; and so on in increasing numbers until at the time of the signing of the armistice there were eighty-one mills buzzing away in various parts of France, with a dozen more in process of completion. If the war had continued, it would have been necessary for

the American foresters and lumbermen to have gone into some of the rougher mountain territory, where more difficult lumbering operations would have met them, including construction of railroads over steep grades and rocky passes. The engineers were preparing to meet these problems.

France was divided into districts to facilitate the handling of the forestry work, the number of districts being increased from time to time until there were eventually fourteen, one for each battalion, with headquarters at the following places: Dax, Major Brookings commanding; Epinal, Major S. O. Johnson; Dijon, Major Sanborn; Mimizan, Captain Phipps; Gien, Captain Lynch; Lapit, Major Kellogg; Chateauroux, Captain Maas; Bauge, Captain Vail; Bourg, Major Barnes; Bourges, Major Hinkley; Pontenx, Major

Lafon; Besancon, Major Kelley; Eclaron, Major Spencer, and Le Puy (the birthplace of Lafayette), Major Bartelme.

No finer body of men ever went from America than the foresters and lumbermen of the 20th Engineers. The highest tribute that can be paid to them is this: They did all that was expected of them—and more. The work which they did, the toil and the struggle in rain and mud, through long hours of the day and night, to get the timber out of the forests and through the mill; with no opportunity for decoration or military reward for service gallantly performed; fighting against obstacles which tried men's souls and made them "turn gray"—all this makes the members of America's great forest and lumber regiment worthy of a glowing page in the history of the world war for



CAPTAIN HOWARD Y. WILLIAMS

Chaplain of the 20th Engineers (Forestry) and doing yeoman work for God and country in France.



CAPT. H. R. CONDON

Headquarters, 11th Battalion, 20th Engineers



Photograph by Harris and Ewing

AMERICAN FORESTRY'S PORTRAIT GALLERY OF OFFICERS OF THE TWENTIETH ENGINEERS (FORESTRY)

1. 1st Lt. W. G. Conklin. 2. Capt. Frederick C. Moore. 3. 1st Lt. Frank Mizell. 4. 1st Lt. R. H. Rowdybush. 5. 2nd Lt. Luther B. McDaniel.
 6. Capt. F. R. Weisel. 7. Capt. J. H. Price. 8. 1st Lt. Alfred D. Kettenbach. 9. 2nd Lt. Charles J. Davis. 10. Major George H. Kelly. 11. 1st
 Lt. Cornelius W. Smith, former Chaplain, 20th Regt. 12. Major William C. Moore.



CAPT. JOHN B. WOODS

civilization. All but a few of the men who enlisted in the various forest battalions reached France. Among those who were destined never to arrive were 91 who went down on the ill-fated *Tuscania* when she was torpedoed off the Irish coast by a German submarine. Aboard this vessel was the 6th Battalion. Excellent discipline prevailed, however; prompt assistance came and most of the men were saved.

In describing this disaster, Thomas P. Reid, Yale Forest School, '13, wrote: "I had just finished supper and was back on deck, life belt on and all prepared, when the crash came. A tearing and a heavy thud, followed by a tremendous fall of water, left no doubt as to what had happened. An instant of silence, darkness and a great shouting as the fellows ran to their boat stations. Boats were lowered, some in good order, others in bad shape, and as one end fell faster than the other or went down with a crash, capsized and spilled all the men who were in it." After telling how eleven men got into a broken boat by jumping from the deck above, a good thirty feet, he adds:

"One of our fellows became chilled. We were all pretty wet, but not too cold to whistle, or chew tobacco, and even smoke cigarettes. We rubbed the chilled one, pounded, stood him on his feet, and 'cussed' him to make him 'hot,' and succeeded, for when a trawler finally picked us up about midnight, he was in pretty fair shape.

"Six hours later we were landed, 500 of us, somewhere in Ireland, where nothing was too good for us. Seemed like the whole town just spread themselves; tobacco, clothes, food, candy, money was almost forced upon us all. There were entertainments by the Naval Base Red Cross, and so forth. There will always be the warmest of spots in our hearts for the people there. Withal it was really wonderful how so many were taken from the ship in almost perfect order."

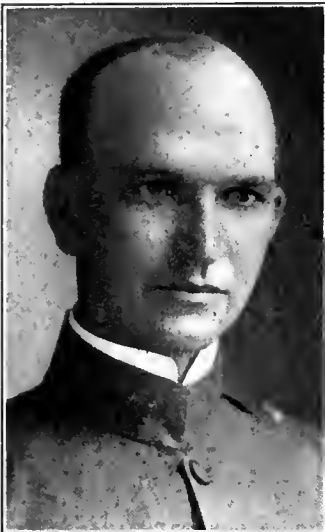
Major Wade, in command of the 6th Battalion, was the last soldier to leave the sinking *Tuscania*.

While none of the other members of the forest regiment were compelled to go through an experience as gruelling as that which befell those aboard the *Tuscania*, nevertheless there was excitement and adventure aplenty almost from the moment the various battalions entrained at American University Camp, ready for the long journey, right through to the end. There were new experiences to satisfy the most venturesome. The story of the trip across of the two battalions composing the 10th Regiment, the first to sail, may be taken as typical of similar experiences by those who followed. Here is the interesting account of that journey as related by Major David T. Mason, professor of forestry in the University of California, who hepled to organize this first forest regiment and went with it to France. They sailed from New York on the Cunard liner, *Carpathia*, leaving there September 10. Major Mason continues:

"There were the usual scenes at the port of embarkation; a ferry boat carried the regiment from the Pennsylvania terminal to the pier where the *Carpathia* lay. For many of the men this was the first glimpse of New



SECOND LT. JOHN W. SELTZER



FIRST LT. RISDEN T. ALLEN



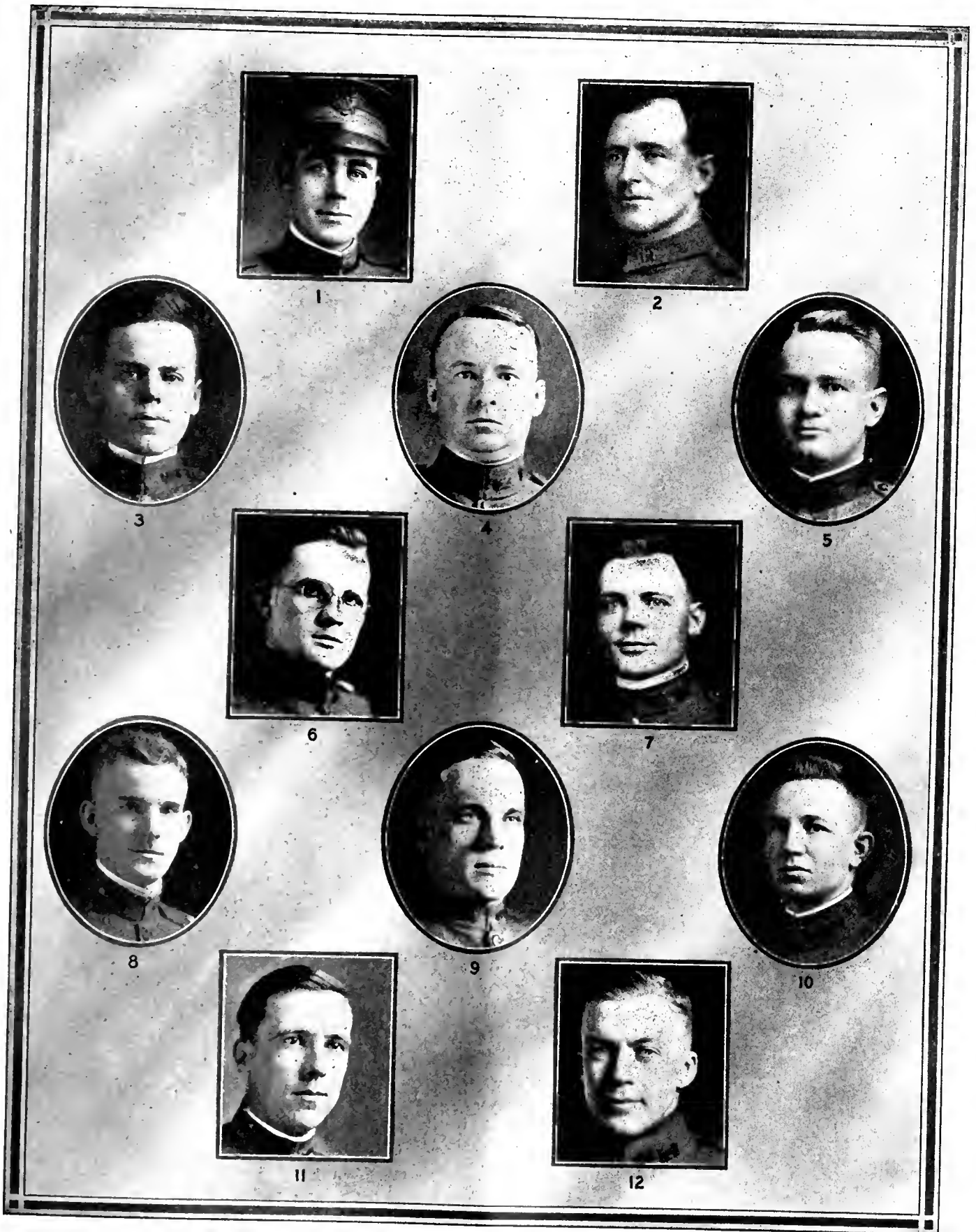
CAPTAIN DORR SKEELS



FIRST LT. ROBERT L. DEERING



2nd LT. STANLEY H. HODGMAN



Photograph by Harris and Irving

AMERICAN FORESTRY'S PORTRAIT GALLERY OF OFFICERS OF THE TWENTIETH ENGINEERS (FORESTRY)

1. 1st Lt. William A. Foster. 2. 1st Lt. Clement C. Abbott. 3. 1st Lt. E. B. Hamilton. 4. Capt. Earle P. Dudley. 5. 1st Lt. Fayette L. Thompson.
6. 1st Lt. Leroy A. Schall. 7. 1st Lt. Fred A. Stone. 8. 1st Lt. Robert B. Hill. 9. Capt. John Summerset. 10. 1st Lt. R. N. Benjamin.
11. 1st Lt. Charles P. Hatrick. 12. 1st Lt. Albert L. Shellworth.

York, and it was a brief one, for sentries at the head of the pier prevented any visiting ashore. Less than a half dozen friends of members of the regiment were on hand to wave "goodbye." The decks had been alive with men all day, but as the ship backed out into the stream, everyone was ordered out of sight, and she steamed down the harbor apparently an ordinary freighter. Farewells were waved to the Statue of Liberty outlined against the last glow of the sunset sky.

"A two-day run brought the Carpathia into the beautiful land-locked harbor of Halifax, where there was a nine-day wait for the assembling of the convoy. These were impatient days, for all wanted to be on the way. Although the men were not allowed shore leave, it was permitted to lower the ship's boats and to row around the inner harbor; the principal interest of these days was in the boat races organized between the companies of the 10th and with the boats from other ships. Finally the convoy was ready, and on September 21, thirteen merchant ships, some of them transporting American, Australian and Canadian troops, wound slowly through the narrows and down the outer harbor past ships of the British Navy. There was no hiding below this time; all were on deck to send back cheers in return for the fine music and cheers from the navy. At dusk the convoy passed in single file through the submarine net guarding the harbor. As night came on the regular convoy formation in three columns was taken. We found ourselves under the escort of a cruiser so fantastically camouflaged that she was promptly nicknamed the 'scrambled egg.'

"There was a certain grimness in the arrangements on the Carpathia which gave a not wholly unpleasant indication of the possibility of adventures ahead. Small boats were swung out over the side ready to be hastily launched. Piles of life rafts encumbered the decks. Life preservers were much in evidence, especially after the danger zone was reached. The ship followed a zigzag of courses, changed every few minutes. Everything was dark at night; even smoking on deck was prohibited. There were the frequent station drills, when at the warn-

ing from the siren, every one in his life preserver moved quietly but rapidly to his station for abandoning ship; at first it took twelve to fifteen minutes from the time the alarm was given for all to reach their stations, but later careful training reduced this time to about five minutes. There was a thrill one thick, stormy night when the alarm sounded; in the fog, the 'scrambled egg' had nearly rammed the Carpathia. A small storm which

lasted for two days sent a good many to their bunks; later in censoring letters, those of us who had the censoring to do were amazed to find some such remarks as this in almost every letter: 'It was a great storm; everybody was sick but me. Ha! ha!' The decks were filled nearly all day with the different companies up in turn for their physical drill. One afternoon everyone was delighted when the group of ten specks that climbed 'over the hill' to the southeast drew nearer and turned out to be our destroyer escort to take us through the 'danger zone.' The destroyers spread out in a ring around the convoy and darted back and forth in a very businesslike manner. We realized then that there had been a little tension and that it was good to have the destroyers for company.

"After two days in the danger zone the convoy divided. Part went into Liverpool; the Carpathia, with several other ships,

headed for Glasgow. In the early morning of October 2 the hills of Scotland were first sighted. The destroyers turned back as the mine fields at the mouth of the Firth of Clyde were entered. A little later the convoy passed through the gate in the submarine nets at Greenock, and there waited for the tide before going on up the river. The sail up the Clyde is a vivid memory. There were glimpses of "tank"-manufacturing plants, of famous German submarines captured and brought to port. The river, lined for miles on both sides with ship-building plants, is so narrow that the new ships have to be launched at an angle to prevent their striking the opposite bank. Steaming slowly up the river, we were heartily cheered by the thousands of shipworkers along the shores. They were near enough to see the expres-



MAJ. DAVID T. MASON

sions on their faces; they were evidently delighted to see the first American troops to arrive in Scotland, and we were at least equally glad to see the Scotch. It was especially interesting to note the great number of buxom Scotch girls in smocks, breeches and puttees working on ship construction.

"After a few hours of well-ordered hustle in getting off the troops and baggage, the regiment entrained for a destination to us unknown. Fifteen hours on the train brought us to Southampton, England, where a few days were spent in a so-called "rest camp" awaiting transportation across the channel. No one seemed to know just why the word "rest" was used in connection with such a camp, for it was anything but restful. The line of march from the city out to this camp was along a splendid avenue beneath an arch of magnificent elms. The avenue, strange to say, had been constructed in other days by other soldiers waiting to take ship from Southampton—British soldiers waiting to embark for the Atlantic voyage in the days of the American Revolution. Few of us had ever been in Europe before, so that there was keen interest in investigating the old parts of the city—the remains of the old walls, the old inns like pages from Thackeray, the monument on the waterfront to commemorate the sailing of the Mayflower in 1620. A brief glance at beautiful England, and we crowded aboard a shallow draught side-wheel boat to be whisked across the English Channel to La Havre during the night."

While the various battalions and even some of the companies were broken up when they reached France and scattered in widely different parts of the country, from the rich maritime pine section of the southwest up through the central part and on to the Vosges and Argonne regions, their experiences in many respects were similar. Some of the incidents which befell the 10th Regiment along the way are picturesquely described by Major Mason, who says:

"France was reached on October 7, but there were still days of travel and waiting ahead before timber operations could begin. Fortunately, only a day was spent in the rest camp at La Havre, sheltered from the pelting rain in sheds paved with cobbles. Once more the regi-



CAPT. JOHN D. GUTHRIE

ment entrained with the destination unknown to us. The French troop train, now so well known to millions of Americans, was a curiosity to us. There were the usual "eighty-four" cars—little box cars plainly marked "eight horses lengthwise or forty men." It was hard to see how forty husky Americans, each carrying his full equipment, could crowd into one of the little cars, but it was done. There were rough benches in the cars, but no toilet facilities whatever. Thirty-six hours of slow running, which carried us around the outskirts of Paris and gave a glimpse of the palace at Versailles, finally brought us to Nevers, a small city in almost the exact center of France.

A tent camp was pitched in a well turfed field in the outskirts of Nevers. A few days of rain and the tramping of twelve

hundred odd pairs of feet soon stirred up a large mud pie bearing little resemblance to the original field. Here the regiment waited for two weeks for the arrival of motor and other equipment brought on the Carpathia. Looking back it now seems remarkable that so much of the equipment succeeded in crossing England, the Channel and half of France so quickly. In Nevers, we had our first experience in the French lumber business; about two thousand feet of lumber was needed for crating material, so a motor truck and a detail of men went out to find it; after the biggest local stock of lumber had been found, there was a long parley through an interpreter with the woman who managed the place; finally some green, rough white fir, grading about number two common, was found in three-fourths inch and one inch thicknesses; we paid at the rate of one hundred dollars per thousand feet board measure for the thinner stock and one hundred twenty dollars for the thicker.

"To meet the most pressing timber needs of the American Army, the regiment was split into five parts for work in different parts of France. Two and one-half companies were ordered to the pine forests along the coast in the southwest; two companies were to go into the fir forests of the Vosges Mountains in Eastern France; and a half company was to cut pine in Brittany near the coast in the northwest; and two other companies were to work in different parts of Central France.



HEADQUARTERS OF THE AMERICAN OPERATIONS IN THE VICINITY OF PONTENX, IN ONE OF THE GROUP OF SCHOOL BUILDINGS ON THE PONTENX VILLAGE GREEN, LANDES, FRANCE

As fast as equipment arrived it was divided between the different units; as soon as there was sufficient equipment on hand to permit work to begin, the units proceeded to their stations, which were reached just before November 1. Only a comparatively small part of the logging equipment and no complete sawmill units had accompanied the regiment on the Carpathia, so the first work was necessarily to be limited to that preparatory to sawmill operation and to that of producing timber in the round.

"The writer was assigned to the work of taking the motor train of the First Battalion across country from Nevers to Pontenx, a small village about sixty miles southwest of Bordeaux. The three days allowed gave just time enough to make the three hundred sixty mile run, for the heavy trucks could do only about twelve miles per hour, and lack of lights limited the running

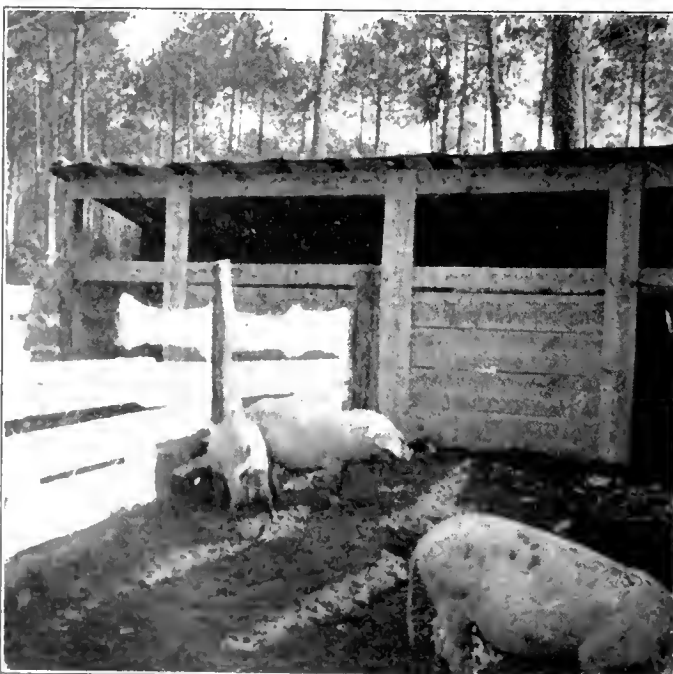


THESE LOADING CRANES WERE USED FOR TRANSFERRING THE LUMBER FROM NARROW GAUGE TO BROAD GAUGE CARS IN MANY OF THE SHIPPING YARDS OF THE 20th REGIMENT

fruit trees yield their annual crops, and finally their timber; in Southern France, cork oak trees furnish crops of bark every eight or ten years; Lombardy poplars, locust, sycamores and others are valuable mainly for their timber; all add greatly to the beauty of the highways. Along much of the route the French had seen no Americans before, and our welcome was the more hearty for that reason. The motor train reached Pontenx just before the arrival of the train loaded with troops, supplies and equipment."

A picture of the men in their camps, of the way in which preparations were made for their living and for the lumber operations which they were anxious to start as promptly as possible, is given by Major Mason, who says:

"The first day in the 'Landes,' as the pine forested region of Southwestern France is known, was an especially busy one. The railway cars had to be unloaded and released immediately and camp established in the pine forest four miles away. Fortunately, a bright,



20th REGIMENT TROOPS AT THE BELLEVUE CAMP IN FRANCE USED KITCHEN REFUSE TO FEED HOGS, RAISED THE HOGS AND AUGMENTED THEIR COMPANY FUNDS BY SELLING THEM



A LOAD OF PILING APPROXIMATELY 70 FEET LONG ON MOTOR TRUCK AND TRAILER GOING AROUND SHARP TURN IN THE ROAD IN A FRENCH SPRUCE FOREST. OPERATIONS OF 20th ENGINEERS

sunny day among a long series of rainy ones made it possible to get under cover without wetting men and supplies. The underbrush was cleared from the camp site, and trees felled to make room for the pyramidal tents. Kitchens were soon ready to serve hot meals to the long lines of hungry men. Bed sacks were filled with straw and for the first few nights were placed direct on the wet sand; water oozed up through that sand for days. As soon as possible lumber was obtained from nearby French mills to be used in flooring the tents and in building bunks. Sibley stoves installed in the tents improved conditions and men no longer had to go to bed right after supper to keep warm. Although there was plenty of wood handy on the camp site, it was all sappy and wet, and dried out very slowly during the winter. For fully two months it was necessary to buy dry wood for the kitchens. At this time dry pine wood was selling in Bordeaux at twenty-two dollars per cord; it was less expensive, of course, in the forest near Pontenx. Wells were dug through two or more layers of hard pan to get away from the surface water, and even the water so obtained was chlorinated before it was put in the lister bags, or 'Carrie Nation cows' as they were familiarly known, for the men to drink. Kitchen refuse was partly

burned in incinerators and partly fed to hogs. The hogs turned out to be an important source of profit to the company funds; young pigs weighing twenty to twenty-five pounds were bought from the natives for about twenty dollars per head, and after a few months' feeding until they had reached a weight of about two hundred pounds they were sold in the French markets at about seventy dollars per head.

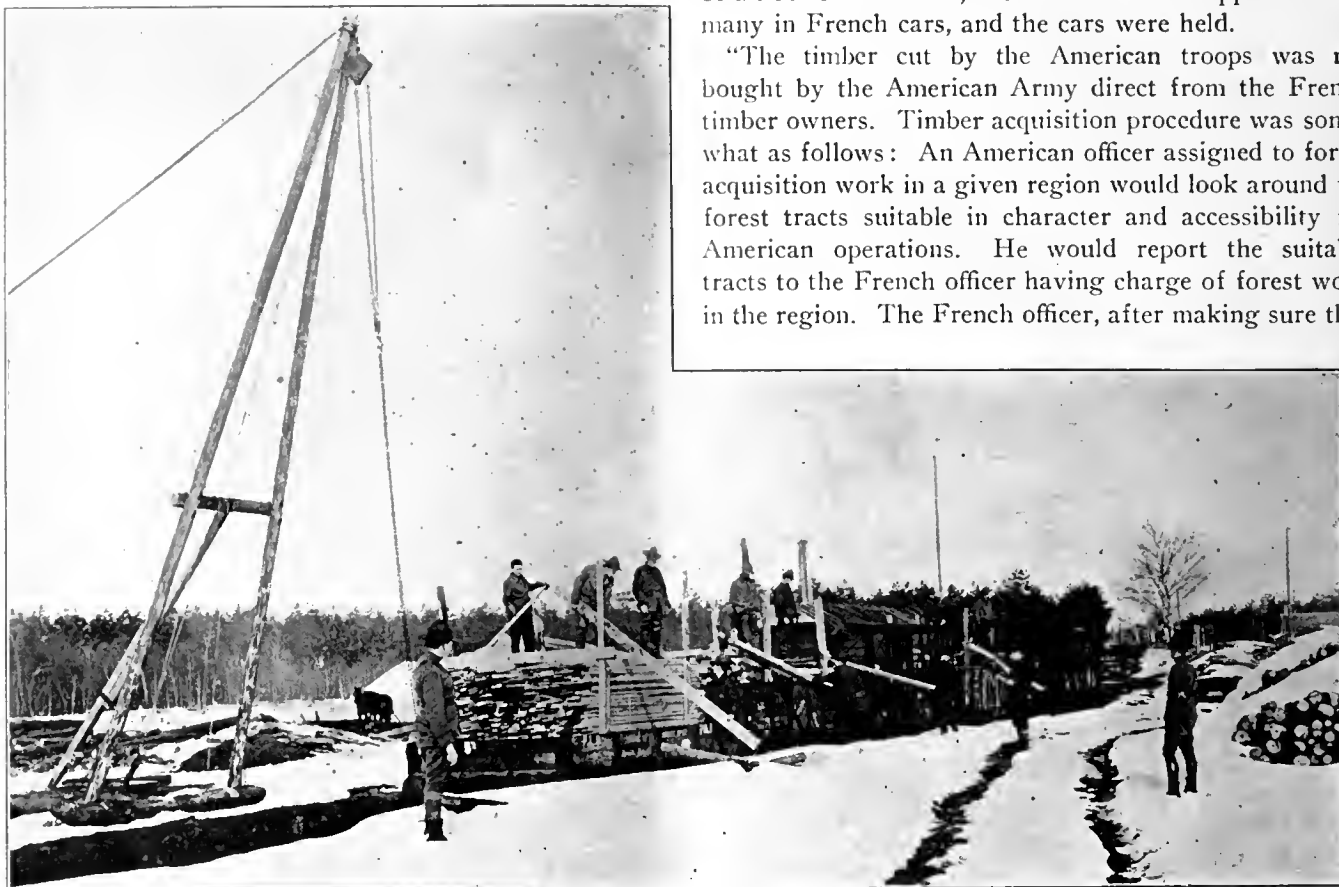
"This camp at which American forestry operations began in the Landes was in a section of the country quite typical of the two and three-tenths million acres of pine forest which border the Atlantic and at places extend sixty miles or more inland in Southwestern France. Originally a worthless, sandy, marshy waste, it has been reclaimed by drainage and the planting of forests of maritime pine until now it is one of the richest portions of France. The region is now about eighty per cent forested with even-aged stands of trees of different ages up to sixty years in the different stands. The unforested area consists of small lakes and highly cultivated little farms scattered through the forest; the farmers work both on their farms and in the adjoining forests, thus furnishing a stable supply of labor for the forest work.

"Timber operations were started immediately by small crews, while other crews continued the work of settling camp. The first work was that of getting out piling, greatly needed for the construction of American docks



THE LUMBERJACKS AND FORESTERS HELPED TO BUILD TELEPHONE SYSTEM PLATFORMS IN FRANCE WHICH WERE LIKE FIRE LOOKOUT STATIONS IN OUR OWN FORESTS.

at the port of Bassens, near Bordeaux. There were sufficient tools to fell the trees, but only makeshift logging equipment to get the piling to the edge of the hard road. No horses had yet arrived. It was quite amusing to see a forty-foot piling, suspended beneath the axle connecting a pair of dump cart wheels, dragged through the woods by ten men on a rope ahead while ten more men with cant hooks helped along the sides. A drenching



THE SPEED WITH WHICH THE 20th ENGINEERS LOADED LUMBER TRAINS AMAZED THE FRENCH, AS DID MOST OF THE OPERATIONS OF THE REGIMENT

rain was falling, but the men paid little attention, for at last they were getting out timber. To move the piling to the railroad escort wagon, running gears were rigged up to carry the small ends while the butt ends were carried on F. W. D. motor trucks; three pieces were taken in each load. It was almost impossible to run the trucks slowly enough to be safe for the escort wagons, so when the horses arrived a few days later, a four-horse team and another escort wagon were substituted for the truck.

"Foundations were constructed so that the sawmills might be set up as quickly as possible when they arrived from America. Large quantities of logs were cut and decked ready for the mills. Telephone lines were built. Work was started on the installation of railway switches and spurs. This preliminary work was all very necessary, but the men were impatient to smell new pine boards and sawdust. So to get some lumber production started, even though small in amount, the night shift of a French sawmill was leased; this mill could produce only about three thousand feet of lumber each night, but

it was a beginning. The production of fuel wood from limbs and tops and of barbed wire stakes from small trees was under way. At this stage of the operations, especially, it was difficult to secure railway cars in which to make shipments. Throughout the war, France was struggling with a car shortage partly caused by pre-war planning by the Germans, as immediately before August, 1914, Germans bought great quantities of raw-materials of all sorts in France; the material was shipped to Germany in French cars, and the cars were held.

"The timber cut by the American troops was not bought by the American Army direct from the French timber owners. Timber acquisition procedure was somewhat as follows: An American officer assigned to forest acquisition work in a given region would look around for forest tracts suitable in character and accessibility for American operations. He would report the suitable tracts to the French officer having charge of forest work in the region. The French officer, after making sure that

there was no sufficient reason why the Americans should not have the timber in question, would estimate the amount, appraise the value and mark the timber for cutting. If the owner was satisfied to sell the timber at a reasonable price, his figure would be accepted, but if the owner asked an exorbitant price, the French officer would fix a reasonable price at which the timber would be requisitioned. The French government purchased the timber and resold it to the American Army at cost. Rights of way were obtained in much the same fashion. This system undoubtedly protected the United States from the serious overcharges which would have been possible through our lack of knowledge of French timber values. The value of timber was astonishing to Americans, used to prices of from two to eight dollars per thousand feet on the stump for pine timber in most parts of America; it was found that the pine timber of the Landes was costing from twenty to forty dollars per thousand feet, depending upon quality and location; hardwood of similar quality in central France was even

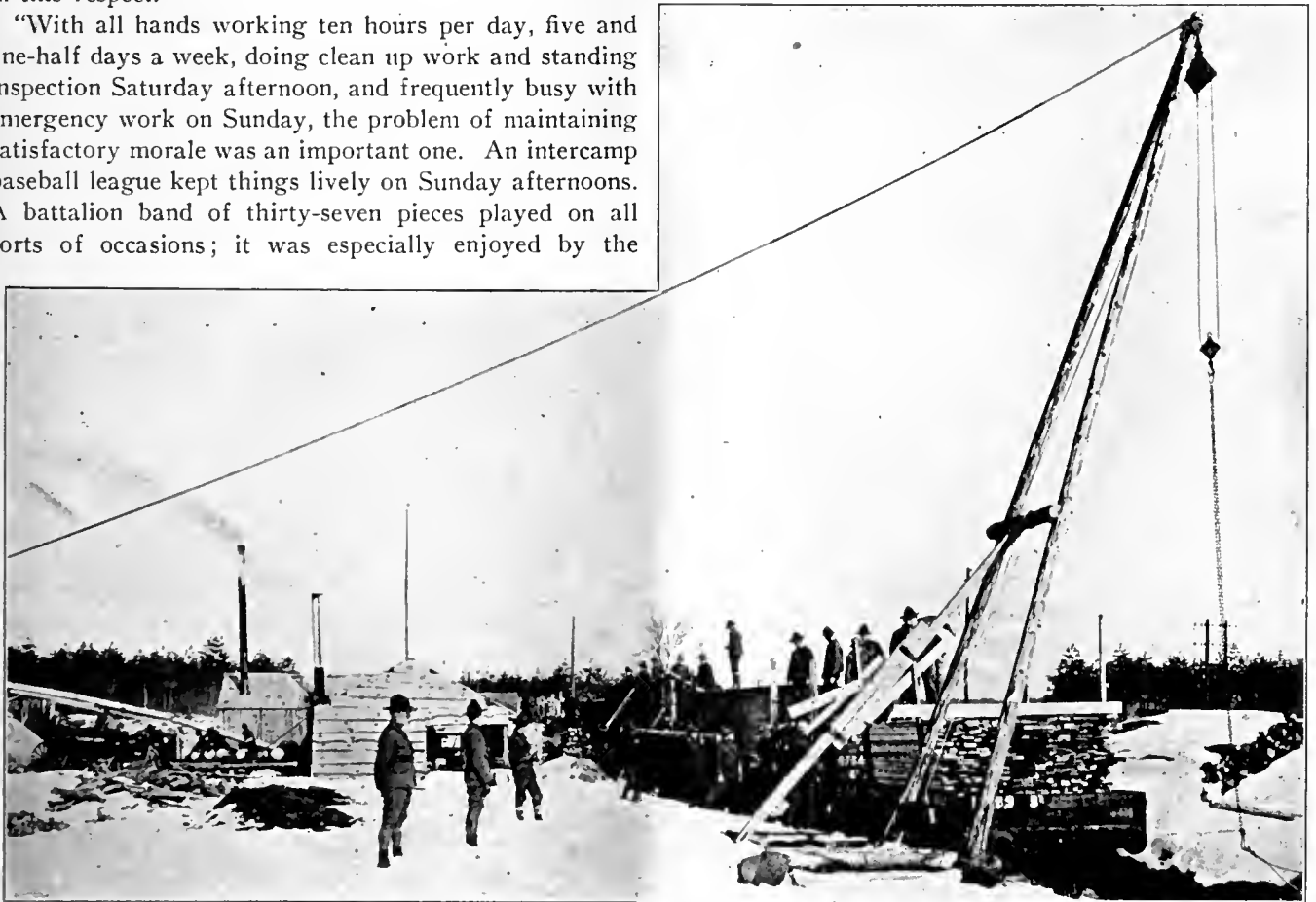
more costly. With these values in view, it is easier to understand the very close utilization of all classes of material in the French forests.

"The question of amusement and of keeping the men in first-class physical condition, properly disciplined and in good spirits, was an important one and was well looked after. The Y. M. C. A. and the chaplains who were assigned to the regiment performed worthy service in this respect.

"With all hands working ten hours per day, five and one-half days a week, doing clean up work and standing inspection Saturday afternoon, and frequently busy with emergency work on Sunday, the problem of maintaining satisfactory morale was an important one. An intercamp baseball league kept things lively on Sunday afternoons. A battalion band of thirty-seven pieces played on all sorts of occasions; it was especially enjoyed by the

tuted; this resulted in a marked improvement in morale. In the spring, especially with the news of the successful German drives, many of the men became restless and there were many applications for transfer to combat organizations; if these applications had been acted upon favorably, few would have been left to run the sawmills.

"The men were cordially received by nearly all of the French people. Most of the Americans made at least

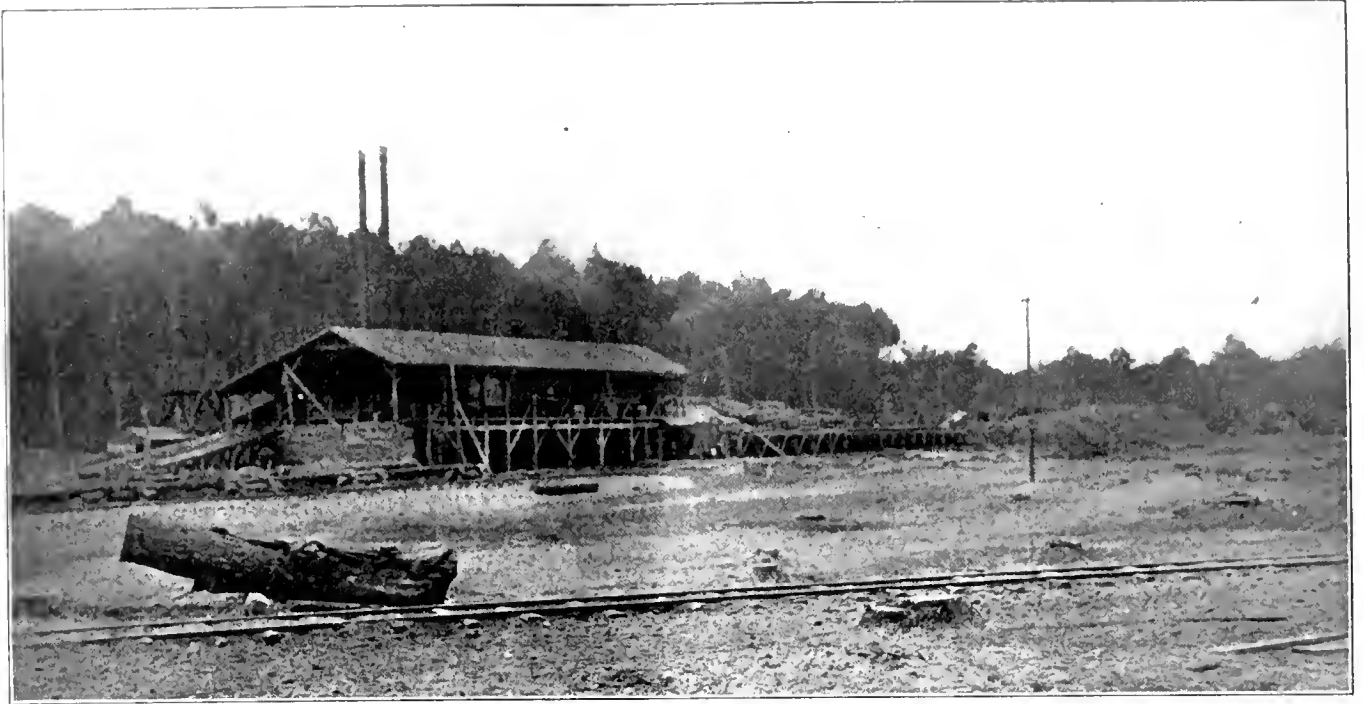


LARGE CREW OF AMERICAN ENGINEERS MAKING QUICK WORK OF LOADING LUMBER AND TIES ON FRENCH RAILWAY CARS

French civilians, who had been without music since the beginning of the war. The Y. M. C. A. installed a hut in each camp where such features as reading matter, writing materials, phonographs, billiard tables, pianos, moving pictures, et cetera, were much enjoyed; one of the most appreciated features was the 'Y. M. C. A. lady.' When the fine weather came, men were sent by motor truck each week from some camps to nearby places for a two-day week end holiday. On Sundays some men toured the nearby country on bicycles, and from Pontenx for instance men hiked over the dunes to the ocean for a few hours on the beach. The seashore was especially popular after a torpedoed Portuguese ship was beached, for it had in its cargo three thousand barrels of wine—'pas de vin ordinaire, mais de l'ambroisie.' Military drill had been abandoned during the short days and pressing work of the winter; there was evident a falling off in spirit and discipline; in the spring, short periods of drill on Saturday afternoon and Sunday morning were insti-

a few goods friends among the French. Their efforts to learn the language were earnest and, no doubt, often amusing to the French. The medical officers with the forestry and lumber troops did a great deal for the French civilians. The abbe of the church at Pontenx arranged a special Easter service in English for our men. There were many such exchanges of courtesy, which made for hearty friendship between the French and Americans.

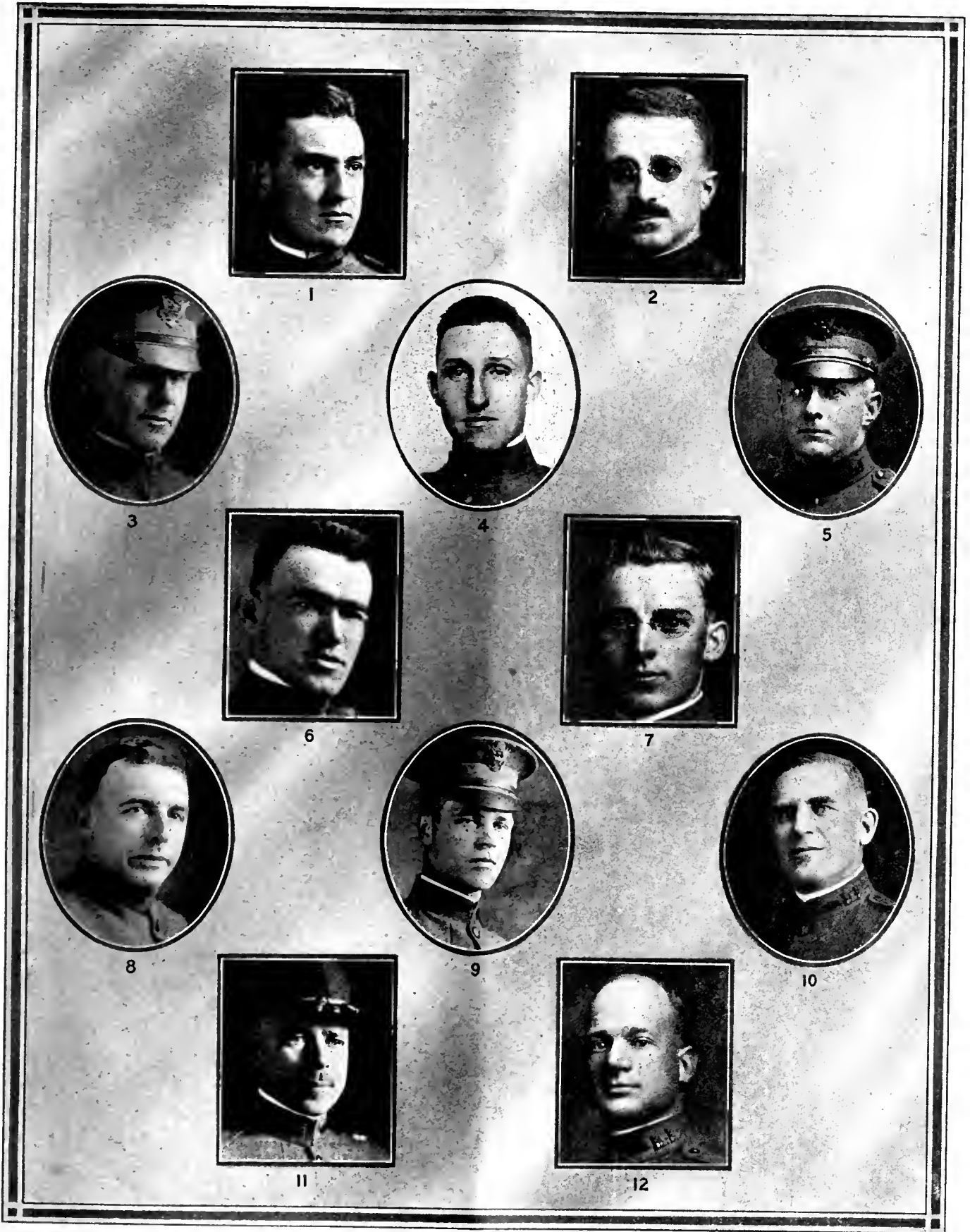
"Unfortunately, the attitude of a few of the peasants in the pine forest districts was not so friendly at first. They said among themselves, 'Look at those strapping big American soldiers. Why do they come here? They are bigger and stronger than our men ever were. While our men, who have been away for over three years, and are still at the front fighting, these Americans come to hide in the forest and to do the work our men should be here doing; they cut the trees that we want to save for our turpentine industry. Why don't they go to the



VIEW OF THE MILL YARD OF THE BOURICOS 20-M AMERICAN MILL NEAR PONTENX, LANDES. A LOG TRAIN HAS JUST BROUGHT THE LOGS OVER THE NARROW GAUGE RAILWAY SYSTEM FROM THE FOREST TO THE POINT WHERE THE LOGS WILL BE UNLOADED ON TO THE SKIDS IN THE FOREGROUND, OVER WHICH THE LOGS WILL BE ROLLED TO THE CARTS AT THE LEFT, UPON WHICH THEY WILL BE PULLED UP THE INCLINE INTO THE SAWMILL. THE GREAT HEAP OF SLABS AND EDGINGS AT THE RIGHT OF THE LOG TRAIN ARE DESTINED TO BE MADE INTO CHARCOAL FOR USE IN A NEARBY MUNITIONS PLANT



A 20 M AMERICAN SAWMILL IN THE SAND DUNES NEAR THE ATLANTIC COAST OF FRANCE. MARITIME PINE FOREST IN THE BACKGROUND



Photographs by Harris & Ewing

AMERICAN FORESTRY'S PORTRAIT GALLERY OF OFFICERS OF THE TWENTIETH REGIMENT (FORESTRY)

1. Capt. Harold T. Antrim. 2. 1st Lt. Alexander H. Ellison. 3. 1st Lt. Charles M. Jenkins. 4. 1st Lt. Henry E. Power. 5. Capt. Edwin C. Wemple. 6. 1st Lt. Morton Van Meter. 7. 1st Lt. Marion Nine. 8. Capt. Oliver J. Todd. 9. 1st Lt. Earl B. Birmingham. 10. Capt. W. D. Starbird. 11. Capt. Andrew J. Fisk. 12. 1st Lt. Herbert L. Holderman.

front and fight and let our men come home?' The men even heard the opinion was current among some of the peasants that, if the Allies won the war England would take Northern France and the United States would seize Southern France. Evidently German propaganda was at work. However, the ignorant peasant was not to be blamed too much for his feeling, for he could not see clearly why it was essential that American engineers precede the main American Army in France to get out timber and to use the timber in building docks, warehouses, railroads, hospitals, barracks, et cetera, for the fighting forces coming later on. The intelligent French arranged a series of discussions and took other steps which stilled the complaints of the peasants until the fighting troops appeared at the front in force in the late spring of 1918, when the attitude of all of the French became extremely cordial, where before in some quarters it had been merely polite.

"The impression which the forestry and lumber troops made on the French is perhaps best indicated in a series of compositions written by the school children of a small town. The children were asked by their teacher to write their observations on the Americans; the children had no idea that Americans would ever see what they wrote. [The compositions, published in 'The Independent,' indicate that the children found the Americans cleanly about their persons, polite, good natured, generous, quite free in spending their money and in some cases strongly

inclined to the use of liquor. (It may be said here that, although the American lumberjack in his native habitat is well known as a user of strong drink, there was a remarkably little trouble from this source in France.)] One of the compositions, written by Renee Dourthe, daughter of the schoolmaster, is quoted herewith: 'The work of the Americans is certainly a curious one. I saw them raise huge logs with large pliers, as easily as they would have moved a straw. Their furnaces for their kitchens are half in the ground, in order not to waste any heat. What struck me especially about the American soldiers is their cleanliness. All of them are tall, healthy and strong, owing to their hygiene. Their teeth are very white; and not to soil their hands, they put on gloves, even at work.

"'Another thing I admired also is their politeness. France had the fame of being the most polite nation in the world. We have often heard and read about the French courtesy. Is France going to lose her rank among the well-bred nations?

"'I like the American soldiers who came to help France. I like the Americans who came here to defend justice and right. I admire the Americans who remembered France, and who came to her in spite of the many dangers. Long live the United States of America!'"

[Owing to the fact that the rosters of several companies failed to arrive from France as this issue goes to press, it is impossible to be certain that the titles of some of the officers mentioned in the article are correct.—EDITOR.]

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



LONG MARITIME PILING LOADED ON AMERICAN NARROW GAUGE CARS READY FOR TRANSPORTATION FROM THE FOREST TO THE MAIN LINE RAILWAY SHIPPING POINT NEAR PONTENX, LANDES, FRANCE

A LESSON FROM FRANCE

By CAPT. RALPH H. FAULKNER, 20th ENGINEERS

AT THIS day when the subject of reforestation is receiving some attention but getting only a very small part of the support, both public and governmental, that it should, we have returning to us 20,000 men who have spent from six to eighteen months in France. These men, whether consciously or not, have had borne in upon them the vast importance of a definite and vigorously applied forest policy.

When the 10th and 20th Engineers left this country it is doubtful whether many of them had any idea of the forest wealth of France. I know it was the opinion of the writer that the duty of the regiments would be to cut the timber from public parks and roadways. In fact, I really visualized the entrance of American lumberjacks into the very backyards of the French inhabitants for the purpose of securing timber. My experience was limited mostly to the southwestern part of France, and as our train passed southward from Bordeaux I felt that whoever had given me the idea that France was denuded of timber had most evidently not referred to that part of the country.

More than one hundred years ago that territory on the Bay of Biscay bounded by the Rivers Gironde at Bordeaux and the Adour at Biarritz, was one vast desert

of sand, unceasingly driven inland by the western winds and mounting into dune after dune. This moving mass of sands, which had gone on for more than a century, submerged the crops and villages. The sand dunes thus irresistibly mounted up at a rate said to be about forty meters per year on a length of over 300 kilometers, and an average breadth of six or seven kilometers. More than 250,000 fertile acres were already covered with sand by 1790, and the inhabitants, quite powerless, witnessed the frightful progress of this devastating plague.

The first people to conceive the idea of combating the advance of the sands were two brothers, Desbief, who lived at St. Julien-en-born in the Department of Landes. These two men, upon their private initiatives, set about opposing obstacles in the way of wattle-work and the planting of Gorse and Scotch-broom. At this time no one had conceived the idea of planting maritime pine, so that these two brothers stood out as pioneers in a fundamental plan of forestry. All of their efforts, however, proved unavailing for the sands mounted more rapidly than the growth of the Gorse.

About this time public opinion brought such pressure to bear upon the government of Louis XVI that an engineer was appointed to find some means of stopping



SCENE IN A MARITIME PINE FOREST, SOUTHWESTERN FRANCE. BROAD GAUGE SPUR PARALLELED BY LOADING DOCKS ON WHICH ARE NARROW GAUGE TRACKS TO TRANSPORT TIES AND OTHER PRODUCTS FROM THE MILL TO THE FRENCH RAILWAY CARS IN THE CENTER



AMERICAN OPERATIONS IN PROGRESS IN A FRENCH HARDWOOD FOREST. IN THE CENTER A LOAD OF LOGS ON A CAR ON THE WAY UP THE INCLINE INTO THE MILL

the progress of the dunes. In 1779 Baron de Charlevoix-Villers, a Naval officer, was ordered to study the creation of a naval port at Arcachon. He submitted several papers showing that moving sands could be fixed by vegetation, really adopting the process used at that time at Dunkirk. However, he was unable to put his plans into execution, through transfer to other duties, and for five years the crying need for permanent fixation of the dunes in the Landes and Gironde was permitted to drag on.

In 1784 Nicolas Bremontier, an engineer, born near Rouen, was appointed chief surveyor at Bordeaux. To this man is due probably the existence of the present maritime pine forests in France for he put into execution the researches of Despiey and Charlevoix-Villers. He secured permission from the government to give two years of study to the problem of the sand dunes, and before this time was up, by the pure lights of his views and the persuasive strength of his faith he at last interested the government in the great work of creating forest land out of a vast desert.

At the beginning of 1787 a sum of 50,000 livres was placed at his disposal for the commencement of the work of forestation in his district. It was not until the middle of that year that the first experiments of Bremon-

tier were made. Having profited by the failure of Despiey in the mere planting of gorse he conceived the idea of planting maritime pine and he followed this course successfully until 1793, at which time his government failing to provide funds, he was forced to discontinue his efforts. However, this valiant Frenchman, who had ever the courage of his convictions, was not daunted and applied to the learned societies of France for assistance, having proven to himself and to the inhabitants of this country that the fixation of the dunes was a possibility. He fought with persistent effort and with an admirable earnestness for both the attention and the resources of his government. It was not an easy thing at this time, if one will refer to French history, to convince a government that a plan of forestation deserved important consideration, for it was about this time that France was in the throes of her revolution.

Bremontier saw the changing of a mighty tract of land from a desert of sand, whose yearly encroachment inland was threatening and wiping out entire villages, to a huge forest which would give competence to the populace which it had steadily driven back, and for his unwearied persistence he is entitled to the gratitude of posterity.

It was not until July 2, 1801, that Bremontier was successful in creating a committee, appointed by the Minister for the Home Department (I should judge this to be the same as our Department of the Interior), with instructions to "continue to fix, plant and care for the growth of trees on the sand dunes on the Bay of Biscay." Bremontier, very properly, was made President of this Committee and the work was resumed in the Department of Lands, in 1803 at Lit and Mimizan (where the fourth battalion of the 20th Engineers was located). After this the planting of trees went on uninterruptedly and with increasing activity until 1865 when the primary project was announced by the French Government as completed. The total cost over this entire time was less than 14,000,000 francs (\$2,800,000) and now today, with a very perfect forest plan carried out, those sand dunes which in 1790 threatened all of Southwestern France, have been transformed into an immense forest and exhaustless source of income for the inhabitants. The vast majority of the inhabitants of the Gironde and the Landes, most especially the Landes, find employment with good remuneration in the exploitation of the present-day forest.

It was an admirable victory of human intelligence over brutal nature and indisputably this one man, Bremontier, who died in Paris in 1809, deserves the gratitude of not

only the people of France, but of all those interested in forestry throughout the world.

From this district there is shipped to Great Britain alone over 800,000 tons of pit props per year to say nothing of the shipment of resin and turpentine, and until 1914 an average of approximately 600 shiploads per year of forest products left the ports of Bordeaux and Arcachon. Germany, Switzerland, Italy, Holland and Russia, were all purchasers of this product, which was made possible by the indomitable will of this real hero of France to whom two monuments have been built in the heart of the land which he veritably made.

We have, in America, a district on our South Atlantic seaboard quite similar in soil property to that of the Department of Landes in France, and while we rest on our oars, with a firm conviction that our timber supply is inexhaustible, we must be brought to the realization that this supply is ever moving westward. There are those who scoff at a policy of reforestation, but the work of the man and the eminent success of the man who is the subject of this article, stands out forever as a refutation of any argument against a sane forest policy. Whether or not we have in the United States a Bremontier I do not know, but if we have, it is high time that he come forth and perpetuate our forest East of the Rockies.



WINTER SCENE AT ONE OF THE SAWMILLS IN FRANCE

WAR SERVICE OF THE AMERICAN FORESTRY ASSOCIATION

THE American Forestry Association determined when the United States entered the war to do all it possibly could to aid in the nationwide movement for victory and, as it felt particularly interested in the organization of the forestry and lumberjack regiment, it is perhaps not inappropriate to mention to the men for whom this issue of the AMERICAN FORESTRY magazine is made a souvenir edition, some of its activities.

It aided, through its Conservation Department, the National War Garden Commission organized in March, 1917, and conducted until June 1, 1919. This commission, conceived, directed and financed by Charles Lathrop Pack, president of the American Forestry Association, inspired the planting of war gardens on vacant lots and slacker land throughout the United States. It furnished instruction to individuals, it organized communities, it distributed literature, it—in a word—did everything worth doing to help raise food where none was raised before in order to help, as General Pershing expressed it, "to keep the food coming." Its work resulted in food of a value of over a billion dollars being raised by the war gardeners. It furnished equipment for a war garden at Camp Dix, New Jersey, and this garden inspired the planting of gardens at other camps of soldiers. Its plan of work was closely studied by the French, British and Canadian governments and some of its methods were successfully adopted by these governments. Its work was conducted from the offices of the American Forestry Association, in Washington.

The Association started a fund for the welfare and comfort of the forestry and lumberjack soldiers, as told in detail on another page.

In December, 1919, members of the Association raised a special fund and sent Secretary Percival S. Ridsdale to France, Belgium and Great Britain to study the forest losses of these countries. The result of the trip was an offer by the Association to provide American forest tree seed to help in reforesting the war-stricken forests of these countries. This offer was gratefully accepted, and an effort is now being made to secure the seed needed, partly by donations from states and partly by a fund which is now being raised.

The Association's magazine, AMERICAN FORESTRY, devoted a great deal of its space to articles and photographs about the effect of the war upon the forests of the United States, Canada, France, Belgium and Great Britain, and many more such articles are now in hand ready for publication.

Copies of AMERICAN FORESTRY Magazine were sent to the 20th Regiment in France and to the camps in the United States each month.

The Association is now aiding the Welfare Fund Committee to secure positions for lumbermen and foresters in War Service.

It has since the fall of 1918 earnestly urged the planting of Memorial Trees in tribute to those who gave their lives for their country or offered their lives in the Great War. Thousands of Memorial Trees have been planted and many thousands more will be planted next fall. The movement is spreading rapidly, and in addition to its fitness from the standpoint of memorial tributes it is also most serviceable in the cause of forestry by interesting thousands of people in trees.

"THE GREAT TREE MAKER"

From every section of the United States the American Forestry Association is getting reports of Memorial Tree planting and is registering these trees on its national honor roll. Georgetown University has dedicated fifty-four memorial trees at its 120th Commencement and marked them with the bronze marker designed by the Association. At San Francisco a Hero Grove was dedicated on Memorial Day and Cleveland on the same day dedicated an avenue of Liberty Oaks. Twenty schools in Cincinnati have planted Memorial Trees. The Daughters of the Confederacy are planting Memorial Trees, the Cordele, Georgia, Chapter being the first to register with the Association. The Daughters of the American Revolution are planting, too, the "Our Flag" Chapter, of Washington, D. C., being the first to report to the Association.

Rev. Francis E. Clark has sent a call to the Christian Endeavor Societies of the world to plant Memorial Trees. "Thus

come closer to the Great Tree Maker," says Dr. Clark in his call, which will have far reaching effect. The American Forestry Association will gladly send free instructions to any person or organization planting trees, and it has prepared a planting day program which is being widely used. These are but examples of how wide spread the call of the Association to plant Memorial Trees has become.

Next fall more extensive planting is being planned. In the next issue American Forestry will begin printing the honor roll of those for whom trees have been planted. Every member of the Association can help in this great work by taking the lead in tree planting in his community. Start plans for fall planting in your town now. Work for a Memorial Avenue of trees or for Memorial Trees as the setting for any form of memorial your town may be adopting. Inform the Association of progress made.

JOBS FOR RETURNING LUMBERMEN AND FORESTERS

THE Welfare Fund for Lumbermen and Foresters in War Service has undertaken the task of aiding lumbermen and foresters released from war service to secure positions. The lumber organizations, the lumber trade papers, lumber companies and the American Forestry Association are aiding in this work.

Applications on sheets similar to the one on the next page are now being received by the American Forestry Association and forwarded by the Welfare Fund Committee to lumber organizations and lumbermen throughout the United States who will communicate directly with the men desiring the jobs.

Any men who wish aid in getting jobs and have not yet filed applications may do so now on the application blank printed on the next page.

Lieut.-Col. W. B. Greeley, of the 20th, in writing from France under date of April 26, 1919, to Percival S. Ridsdale, treasurer of the Welfare Fund, says:

"The officers of the 20th Engineers have been considering the question of assisting our returning soldiers to obtain employment in the United States. The policy of the American Expeditionary Forces to evacuate the troops in France rapidly during May and June has made it necessary to act promptly in this matter; and we have accordingly put the following plan into effect. Each company commander of the 20th Engineers and attached Service Troops will be sent a supply of printed forms. The company commanders have been requested to have such forms filled out by any men in their command who desire assistance, to append their own estimate of the soldiers' qualifications and character, and to mail the applications direct to the American Forestry Association, Washington, D. C. The time limits have made it necessary to put this scheme into effect without waiting for prior consultation with yourself or with the lumber organizations who are interested; but I feel that any plan to aid returning soldiers in this manner must begin with specific data on individual cases.

"All of the units of technical white troops, including the road battalions, which have been employed on forestry work in France and have not previously returned to the United States are to be released during the month of May; and may be expected to arrive in the United States roughly between May 20 and July 1. These units comprise approximately 9,700 men. Eight hundred negro Engineer Service Troops which have been employed upon forestry operations will also probably arrive in the United States between May 20 and July 1. The remaining negro Engineer Service Troops in France, aggregating about 5,600 men, will probably arrive in the United States

between June 20 and August 1. Several of the battalion commanders estimate that approximately 50 per cent of their men will desire assistance in obtaining employment.

"I fully appreciate that the plan which I have taken the liberty to initiate and the suggestion contained in this letter represent a large volume of work for the friends of the forestry troops in the United States. It is my strong conviction, however, that no greater service can be rendered to these men in recognition of the sacrifices which many of them have made in coming to France than to assist them in finding suitable employment under some such scheme as that indicated. I also feel that the large sums subscribed for welfare work for the forestry troops could not be expended to any better advantage. Furthermore, the forest industries at home have an interest of their own in getting in touch with a large proportion of these men. Our troops have been employed continuously upon industrial operations in France, under conditions which have tended to develop their technical skill and their resourcefulness to a high degree. Many of them have developed mechanical ability as mill sawyers, saw filers, motor truck drivers and mechanics, engineers and loggers which they did not have when they entered the army. Others have become capable teamsters, capable men on logging railroads, and the like. Many of them have profited greatly by the discipline and sense of organization developed in military service. These men represent, in the aggregate, an enormous economic asset to the United States and especially to the forest industries. It will be, in my judgment, of the utmost mutual advantage to men securing employment and to employers to do everything possible to get these returning soldiers placed so that their individual abilities can be put to the most productive use.

"I have also requested the company commanders to send to you direct statements concerning such cases as they may have where they feel that financial assistance should be extended to returning forestry soldiers on account of family distress, physical disability, or other good reasons, with their own recommendations as to what should be done. I do not anticipate that there will be many cases of this character. The majority of our men are in better condition physically than when they entered the army; and they have been spared the disabilities incurred by combat units. There will undoubtedly be many cases of physical disability among lumbermen who enlisted in combat units, but I know of no way to get in touch with these cases except through the receiving hospitals of the army in the United States."

EMPLOYMENT SHEET

FOR SOLDIERS WHO WISH LUMBERING OR FORESTRY JOBS

Name:..... Rank:..... Unit:.....

Married or Single:..... Age:.....

Address in France:.....

Address in United States.....

Kind of work desired:.....

Section of U. S. preferred:.....

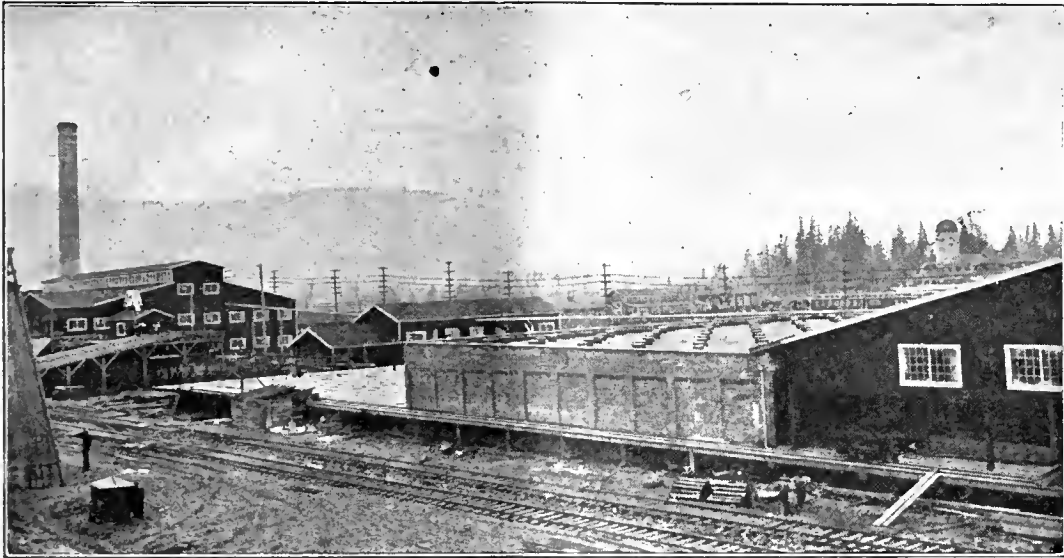
Past experience and qualifications:.....

Name and address of last employer:.....

Other references:.....

Recommendation of Company C. O.:.....

NOTE: THIS SHEET SHOULD BE SENT TO THE AMERICAN FORESTRY ASSOCIATION, WASHINGTON, D. C., THE HEADQUARTERS OF THE WELFARE FUND FOR LUMBERMEN AND FORESTERS IN WAR SERVICE. THE APPLICANTS WILL BE INFORMED OF OPPORTUNITIES FOR EMPLOYMENT OR OF THE NAMES OF MEN IN THEIR HOME REGION WHO WILL BE PREPARED TO ASSIST THEM IN GETTING WORK.



A battery of Moore Moist Air Dry Kilns at Snoqualmie Falls Lumber Company's mill, near Seattle, Washington, on the Pacific Coast. This is the latest of the Weyerhaeuser group of mills, and is said to be the most modern lumber manufacturing plant in the world.

FROM THE ATLANTIC TO THE PACIFIC

you will find many of the

Largest and Most Progressive Lumber Mills

are using

MOORE'S MOIST AIR DRY KILN

for drying their product.

HERE ARE A FEW OF OUR MANY CUSTOMERS:

Central Coal & Coke Co., Kansas City, Mo.
 Weyerhaeuser Timber Co., Everett, Wash.
 Eastman, Gardiner & Co., Laurel, Miss.
 National Steel Car Co., Hamilton, Ont., Can.
 Westside Lumber Co., Tuolumne, Calif.
 Freeman, Smith Lbr. Co., Millville, Ark.
 Savannah River Lumber Co., Savannah, Ga.
 Bagdad Land & Lumber Co., Bagdad, Fla., and Chicago, Ill.
 Lucher & Moore Lumber Co., Orange, Texas.
 Roland Lumber Co., Norfolk, Va.
 E. E. Jackson Lumber Co., Riderwood, Ala., and Baltimore, Md.
 Ragley Lumber Co., Ragley, La.
 Buchner Lumber Co., Portland, Oregon.

Kirby Lumber Co., Houston, Texas.
 Trexler Lumber Co., Allentown, Pa., and Allen, S. C.
 Pickering Lumber Co., Kansas City, Mo.
 Goodear Lumber Co., Picayune, Miss.
 Burton-Swartz Cypress Co., Perry, Fla.
 Fosburgh Lumber Co., Norfolk, Va.
 S. H. Bollinger & Co., Shreveport, La.
 Vredenburgh Sawmill Co., Vredenburgh, Ala.
 Standard Lumber Co., Live Oak, Fla.
 North Portland Box Co. (Swift & Co.), Portland, Ore.
 W. P. Brown & Sons Lumber Co., Louisville, Ky.
 Dunlevie Lumber Co., Allenhurst, Ga.
 Long-Bell Lumber Co., Kansas City, Mo.

We build kilns to suit the exacting requirements of each individual mill. We began building kilns in 1879. Forty years of continuous and successful kiln building enables us to render you real service. Why experiment? Write for catalog explaining our system.

MOORE DRY KILN CO.,

Box 1177,

Jacksonville, Fla.



Showing 14 Moore Moist Air Kilns (they are operating a total of 34 Moore Kilns) at plant of Atlantic Coast Lumber Corp., Georgetown, S. C., on the Atlantic Coast. This is the largest board mill in the world, having a daily capacity of three-quarters of a million feet in boards.

THEY CALLED IT AMEX TIE MILL
WE CALL IT
AMERICAN EMPIRE BOLTER

95

OF THEM HELPED THE BOYS OF THE FORESTRY
DIVISION MAKE HISTORY IN FRANCE



24476 The Amex tie Mill, 20th Engrs.
France.

Lieut. Glenn H. Holloway, of the 20th Engineers, writing in the December 21st issue of The Southern Lumberman, says:

"The American Saw Mill Machinery Company furnished the bolter or tie mill, which is answering its purpose admirably. We only have to face these ties on two sides, so if you get the right sized poles and don't stop to cut any side plank it is possible to cut 30,000 feet in ten hours, once in a while, but the average is nearer 15,000 feet for a ten-hour shift."

SAW MILL MACHINERY OF EVERY DESCRIPTION

CATALOG ON REQUEST

OUR WAR BOOK, A Souvenir Record of the Work of 1200 American Machines, Free on Request

American Saw Mill Machinery Company

1398 HUDSON TERMINAL BLDG.

NEW YORK

THE WELFARE FUND

WHEN the forestry and lumberjack regiment was organized the American Forestry Association started the collection of a Welfare Fund for the purpose of supplying the men with comforts needed and with means for recreation to aid in keeping up their morale. This fund was later developed into the Welfare Fund for Lumbermen and Foresters in War Service, with the following officers: Honorary chairman, R. H. Downman, Council of National Defense, Washington, D. C.; acting chairman, W. R. Brown, Berlin, N. H.; secretary, E. A. Sterling, New York City; treasurer, Percival S. Ridsdale, secretary American Forestry Association, Washington, D. C. The members of the committee are: R. H. Downman, W. R. Brown, E. T. Allen, E. A. Diebold, M. E. Preisch, for the Lumber Industry; W. A. Priddie, E. D. Tennant, for the Order of Hoo-Hoo; A. F. Potter, W. L. Hall, for the U. S. Forest Service; Charles Lathrop Pack, for the American Forestry Association; James Boyd, John W. Long, for the Lumber Trade Press.

The Welfare Fund was devoted to purchasing wool to be knitted into sweaters, scarfs, socks, helmets, etc., to furnishing phonographs, athletic supplies and various articles needed by the men, and in providing funds for the use of the men when their pay failed to arrive. It was also

used in caring for sick and needy persons in the families of soldiers and after they had been ordered home it was used in the endeavor to secure work for those who desired jobs. It is still being used for this particular purpose. The method of finding jobs for jobless men is described on pages 1159 and 1160.

Senior Chaplain Howard Y. Williams of the 20th Regiment, in writing on February 25 from France about the use of the fund, said:

"The welfare fund raised for the men of the 20th Engineers is unique in the A. E. F. No other organization that I know of has had such splendid backing as the forestry troops in France. The \$4,000 sent seemed a fortune when it stood to our credit in a French bank for 22,400 francs. Almost 3,800 francs was assigned to work among the pioneer forestry engineers, the 10th Regiment. Athletic supplies, indoor games, phonograph records, needles, books, sheet music, refreshments for evening parties and other like necessities have been purchased with this fund. One of the large uses to which it has been put has been that of loans. The fund has been put out on loans several times over and has proved a friend indeed to men in need. It has made it possible for men to go out on leave; it has brought to men discharged from hospitals, who had not seen a pay day for



LISTER BAGS ("CARRIE NATION COWS") CONTAINING CHLORINATED WATER FOR DRINKING PURPOSES. BELLEVUE CAMP, PONTENX, LANDES, FRANCE

some time, pocket money to start them on the trip home. This fund has always meant that men and worthy objects could find financial assistance.

"The balance of the fund used distinctively for the 20th Engineers, after initial expenses for entertainment equipment had been provided, was divided among the different battalions on a per capita basis and used by the company commanders as they deemed best in supplying the various needs of their companies. These battalion funds have always been at the disposal of the battalion chaplain and have proven a great blessing.

"The thirty-eight phonographs bought from this fund and forwarded from the States to each one of the original engineer companies have found continual use, sending forth their melodious sounds from tents, barracks, old barns, dugouts, and often used in the open air. These phonographs have proven the opportunity for many a friend in the States to express his interest in us by forwarding phonograph records. I shall never forget standing in front of a dugout in Puvonelle Wood, in the midst of devastation, when suddenly there came upon my ear the voice of John McCormack as played on one of these machines. The contrast between this evidence of civilization and the absolute lack of it around me was tremendously striking.

"Warm clothing is always a necessity in the ever-present humidity of France. The sweaters made from the wool purchased by this fund are a daily comfort to these men, who often have labored all day long in torrents of rain, returning to their tents to find a good warm sweater waiting.

"During these days of waiting to come home, we are bending all our efforts to provide entertainment, parties, educational classes that will occupy the minds of the men and that shall prepare them for larger services in the future. We shall use this fund in every way to provide these events.

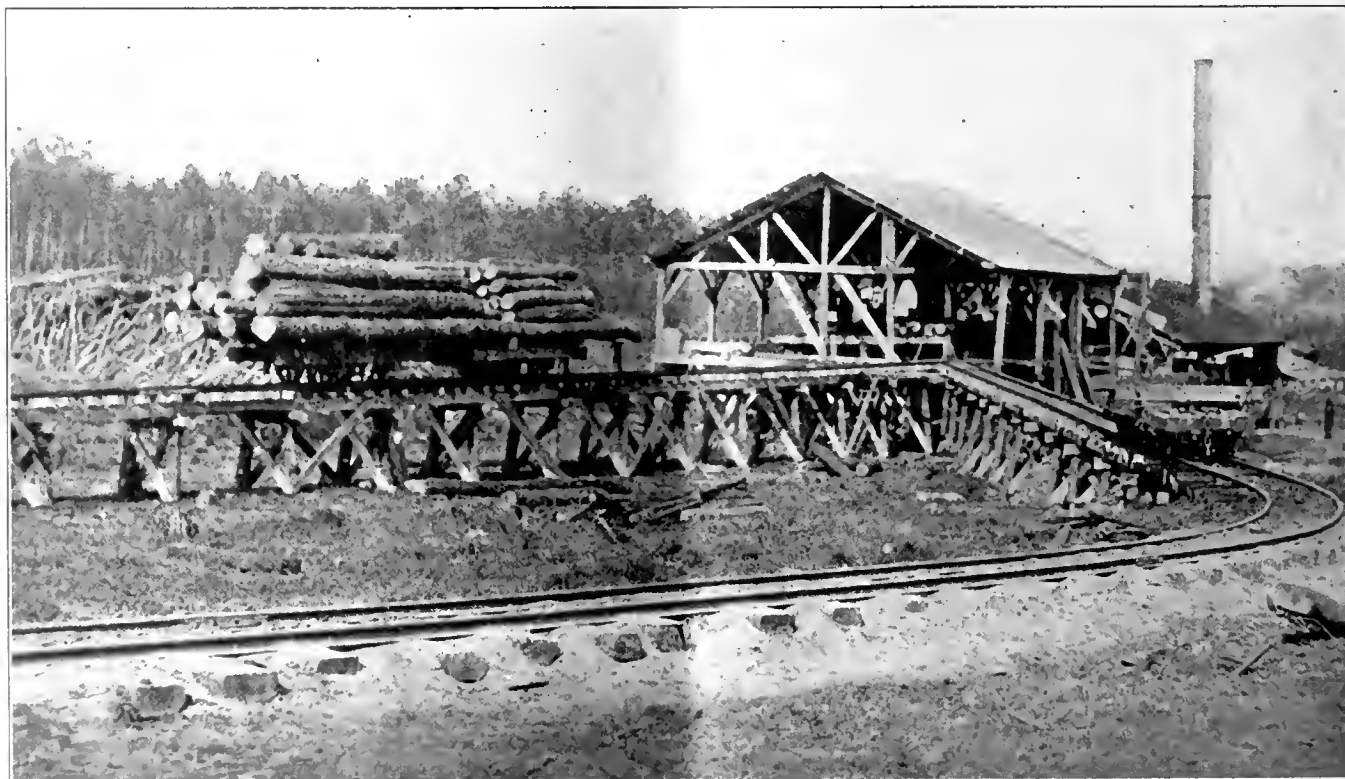
"Twenty thousand soldiers united with me in expressing gratitude to those who have made all these things a reality and a daily reminder of your interest."

The list of donations received by the Welfare Fund is published on pages 1168, 1173, 1175, 1177 and 1178.

HOW THE FOREST SERVICE HELPED

From the day that the 10th Engineers was organized the members of the Forest Service took a deep interest in the regiment and were anxious to find ways in which they might forward the comfort and happiness of the men. The Service had co-operated with the War Department in recruiting the regiment, and a great many of its men were on the regimental rolls. A suggestion that an ambulance would be of great value was seized upon with eagerness, and during the summer of 1917 contributions poured in from the members of the Forest Service in all parts of the country. A fund of \$4,274.68 was raised, more than enough to purchase two motor ambulances and two kitchen trailers. One of these ambulances and its trailer was paid for entirely by the Northwestern District. The remainder of the fund was used to buy a photographic developing outfit for the 10th Engineers and wool to be made into knitted garments.

In September, 1917, when the 10th was ready to leave



MARITIME PINE LOGS ON THE WAY INTO 20-M AMERICAN SAWMILL IN FOREST OF THE DUNE COUNTRY IN SOUTHWESTERN FRANCE

SIMONDS

SAW STEEL PRODUCTS



THE Naval Bureau of Ordnance designed, constructed in the United States, shipped and re-erected abroad, and placed in action on the fighting front, a battery of the finest guns used by any belligerent in the war. One of these is illustrated above.

Simonds Saw Steel was selected *exclusively* for the armor plate on this equipment and was supplied in *record-breaking time*, for the gun and the cars making up each complete gun unit.

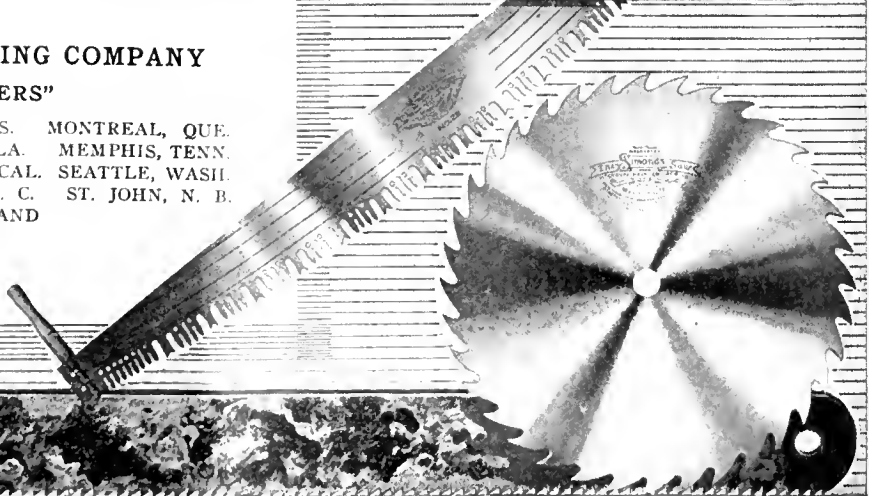
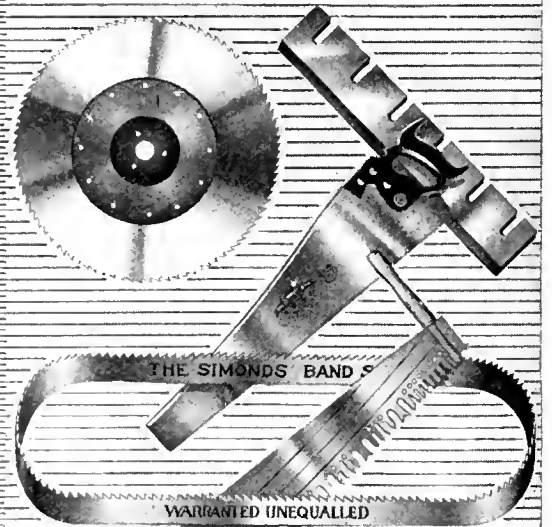
This steel was selected because at that time, early in 1918, it was a well-established fact that the Simonds Manufacturing Company had the best reputation for quality and the most up-to-date facilities for speed of any concern in the United States manufacturing this class of steel.

We also supplied enormous quantities of Simonds Cross-cut Saws, Hand Saws, and Circular Saws, Solid and Inserted Tooth. When you want saws, write us. Catalog sent on request.

SIMONDS MANUFACTURING COMPANY

"THE SAW MAKERS"

| | | |
|-----------------|---------------------|-----------------|
| CHICAGO, ILL. | FITCHBURG, MASS. | MONTREAL, QUE. |
| NEW YORK CITY | NEW ORLEANS, LA. | MEMPHIS, TENN. |
| PORTLAND, ORE. | SAN FRANCISCO, CAL. | SEATTLE, WASH. |
| LOCKPORT, N. Y. | VANCOUVER, B. C. | ST. JOHN, N. B. |
| | LONDON, ENGLAND | |



Simonds

Welcome Home 20th Engineers

Your noble work in The Great War is completed.

The great efforts you put forth—the great assistance rendered the A. E. F.—was largely instrumental in turning the tide of conflict and in speedily ending the war.

Your untiring efforts must now be devoted to reconstruction work in the good old U. S. A.

The lumber industry welcomes you home—there is a great need for your valuable services and assistance.

The future of the lumber business is indeed bright. Building operations have been greatly curtailed during your absence but with settled business conditions here great strides will be made in an effort to partially catch up.

You will be interested to learn that every man from this organization now in service will be furnished employment immediately upon receiving his discharge.

Crookston Lumber Company

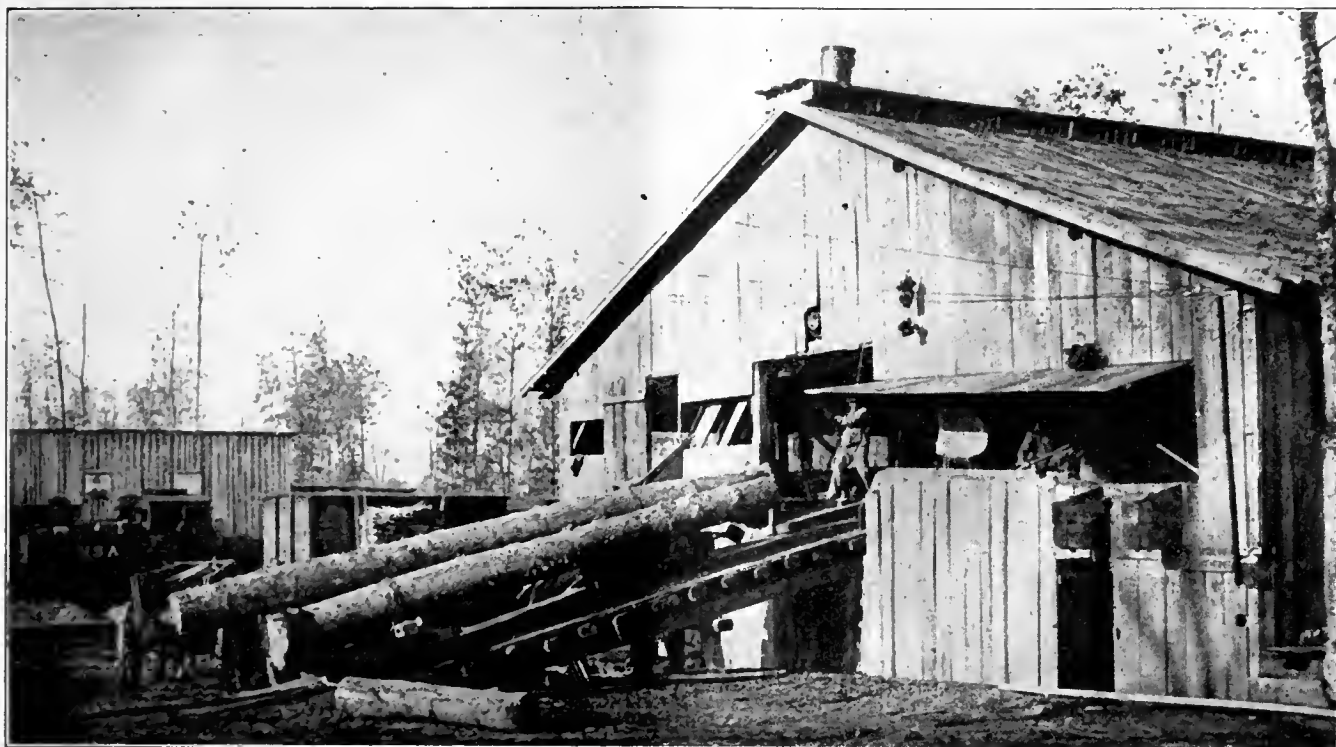
SALES DEPARTMENT



903 First National-Soo Line Bldg.

Minneapolis, Minn.





SNAGING BIG LOGS, THREE AT A TIME, IN A BIG SAWMILL OPERATED BY THE AMERICAN FORESTRY ENGINEERS AT ST. DOZIER ON THE MARNE

for France, money was appropriated by the Department of Agriculture ambulance fund committee for the purchase of six phonographs and records to accompany them. The day the 10th left Washington these were bought and sent to the camp at American University in time to go across with the regiment.

In the fall of 1917 when knitting for soldiers began to be pushed vigorously by the Red Cross, the women of the Forest Service saw their opportunity and took up enthusiastically the making of knitted garments for the men of the Forest Regiments. Wool was bought with money left over from the ambulance fund, new funds were raised, and the work grew to such proportions that regular means had to be provided for handling the wool and distributing the garments. Early in November a women's committee was formed, with Mrs. Henry S. Graves as chairman and Mrs. Lilian T. Conway in charge of organization. This committee took over the purchasing of wool and other supplies, and the making of knitted garments and sending them to the men.

The supplying of comfortable woolen things was the main work of the women's committee. Of course, everybody knew that the lumberjack has plenty of experience in making the best of hardship and discomfort, and that the men of the Forest Engineers had gone to France ready and willing to endure many a visit from these old acquaintances. But frost-bitten toes and a chilly spinal column never made anyone's work improve, and so, as the Chaplain of the 10th put it, "the sound of sweaters in the making was received with great joy" over there.

The sweaters and other knitted garments, however, were not all. The purpose was also to promote cheerfulness in the camps, and one way of doing this was to

send Christmas things. The first work of this kind that the committee did was to get together, pack, and ship a large box of Christmas things donated by the members of the Washington office of the Forest Service. This box contained 126 knitted garments, 164 bags, 75 cans, and 18 packages of tobacco, 2,500 cigarettes, and a quantity of candy, chewing gum, and pocket flash lights. Special arrangements were made to have this box go forward with Red Cross shipments to France, and it was with considerable satisfaction that those who had packed it saw it start on its way on November 15. It did not arrive in time for Christmas. In fact, with this shipment began the difficulties with which the women's committee had to contend all through the war in getting its material into the hands of those for whom it was intended. The boys knew that the box was coming, but they had such a long wait before it arrived that fears began to be entertained that it had gone to the bottom with some torpedoed ship. At last came the word, in a letter dated June 26, 1917: "We received here yesterday a large Christmas box containing a splendid and most welcome assortment of things for the men. . . . I can not but remark with what accuracy of planning and dispatch the box reached us an even and exact six months after the date on which you proposed it should reach us. But not one regret is there, and not one man but is most delighted that the shipping authorities so cleverly divided our 'from home' Christmas pleasures half way between Christmases."

As the 20th Engineers was being organized, the battalions were encamped successively at American University, Washington, D. C. Practically every man in these battalions was supplied with a sweater, and many were

given socks, wristlets, scarfs, and helmets, through the efforts of the Forest Service in co-operation with the Potomac Division of the Red Cross. By March 18, 1918, the committee was able to announce that, with the assistance of the Red Cross, the 10th and 20th Engineers had been supplied with sweaters so that practically every man had one.

The success of the plan to outfit the Forest Engineers with knitted garments was due to the constant and enthusiastic support of the women of the Forest Service in Washington and throughout the western Districts. They kept at the knitting all the time, and continually asked for wool and then more wool. The only difficulty was keeping them supplied. The workers knitted enthusiastically all through the summer of 1918, and the sudden coming of the armistice in the fall found the storage space of the committee filled to overflowing. There was no way of getting these garments across to the Forest Engineers in France. In the fall and winter, with the approval of the committee in charge of the "Welfare Fund for Lumbermen and Foresters in War Service," the garments on hand were distributed to sailors, soldiers at St. Elizabeth's Hospital, hospital orderlies at Camps

Meade and Humphreys during the Spanish influenza epidemic, and the Serbian Relief Committee.

The War Department announced in the fall of 1918 that each soldier in the American E. F. would be allowed to receive one Christmas box, and that he would be given a label which would have to be put on the package before it could be shipped. This order suggested the possibility that there might be some men in the Forest Engineers without any one to whom they cared to send the label. A cablegram was sent by the treasurer of the Welfare Fund to the commander of the 20th Engineers offering to send Christmas boxes to any of the men in the regiment. Labels were received from 283 men. The purchasing of the articles to go into the boxes and the packing was done by ladies of the Forest Service. Special care was taken to provide, so far as the small size of the box permitted, a variety of articles which would be useful to the men and at the same time embody the spirit of Christmas cheer. A number of labels arrived after the Christmas ship had sailed for France. This was a source of great regret, but, as the next best thing to a box, each man whose label came too late was sent a money order and a Christmas card.

DONATIONS TO THE WELFARE FUND FOR LUMBERMEN AND FORESTERS IN WAR SERVICE

TOTAL, \$19,424.44

| | | | |
|--|--------|---|--------|
| Achenbach, Naomi, Everett, Wash..... | \$3.00 | Blanchard Lumber Co., Boston, Mass..... | 25.00 |
| Acorn Club, Seaford, Del..... | 5.00 | Blanchard, A. F., West Acton, Mass..... | 10.00 |
| The Acorn Lumber Co., Pittsburgh, Penna..... | 25.00 | Blodgett Company, Grand Rapids, Mich..... | 25.00 |
| Aberdeen Lumber Co., Pittsburgh, Penna..... | 25.00 | The Blytheville Lumber Co., Blytheville, Ark..... | 10.00 |
| Albert Hanson Lumber Co., Garden City, La..... | 100.00 | Bodwell, Don R., Kansas City, Mo..... | 1.00 |
| Alexander Bros., Belzoni, Miss..... | 5.00 | In Memory of S. G. B..... | 10.00 |
| Alexandria Lumber Co., Alexandria, La..... | 50.00 | Bogert, Miss Anna, New York City..... | 2.00 |
| Allea Mfg. Co., Shreveport, La..... | 50.00 | S. H. Bolinger & Co., Shreveport, La..... | 50.00 |
| The Edmond A. Allen Lumber Co., Chicago, Ill..... | 5.00 | Bomer Blanks Lumber Co., Blanks, La..... | 5.00 |
| Allen, E. T., Portland, Ore..... | 5.00 | Borreson, Jules T., Pine Bluff, Ark..... | 10.00 |
| Amsler, Col. C. W., Clarion, Penna..... | 10.00 | Boswell, T. S., Asheville, N. C..... | 5.00 |
| Anderson-Tully Co., Vicksburg, Miss..... | 15.00 | Bosworth & Son, F. S., Elgin, Ill..... | 10.00 |
| Angelina County Lumber Co., Keltys, Tex..... | 10.00 | Bounds, J..... | 25.00 |
| Arkansas Land & Lumber Co., Malvern, Ark..... | 25.00 | Bowie Lumber Co., Bowie, La..... | 100.00 |
| Arkansas Short Leaf Lumber Co., Pine Bluff, Ark..... | 10.00 | Boyd, James (received through Mr. Tennant)..... | 5.00 |
| Ascension Red Cypress Co., Ltd., New Orleans, La..... | 25.00 | Bradley, E. J., Pottsville, Penna..... | 5.00 |
| Ashville, N. C., Members of Hoo-Hoo (received through Mr. Tennant) | 10.55 | Brady, J. E. (through E. D. Tennant)..... | 1.00 |
| E. C. Atkins & Co., Memphis, Tenn..... | 10.00 | Brendon, Robert, Woodcliff-on-Hudson, N. J..... | 2.00 |
| Atwater, Henry, Bridgeport, Conn..... | 10.00 | The Bright-Books Lumber Co., Savannah, Ga..... | 10.00 |
| Bach, J. N., Fairbury, Ill..... | 5.00 | Brooks-Scanlon Co., Kentwood, La..... | 25.00 |
| Badger Lumber Co., Kansas City, Mo..... | 10.00 | Brooks, Bertha G., New York City..... | 2.00 |
| Baldwin Lumber Co., Baldwin, La..... | 25.00 | Brown Lumber Co., Shamrock, La..... | 25.00 |
| Bannister, F. J. O., Kansas City, Mo..... | 5.00 | Brown & Co., George J., Memphis, Tenn..... | 50.00 |
| Barage Lumber Co., Barage, Mich..... | 10.00 | Brown, Mrs. Harry G., Columbia, Mo..... | 1.00 |
| Bard, Anna G., Hueneme, Calif..... | 2.00 | W. P. Brown & Sons Lumber Co., Louisville, Ky..... | 25.00 |
| Barnes, Miss Anne Hampton, Devon, Penna..... | 20.00 | Brown, W. R., Berlin, N. H..... | 500.00 |
| Barr-Holiday Lumber Co., Louise, Miss..... | 25.00 | Brownell-Drews Lumber Co., Morgan City, La..... | 25.00 |
| E. P. Barton Lumber Co., Charleston, S. C..... | 50.00 | Brownell, R. G., Williamsport, Pa..... | 25.00 |
| Basilan Lumber Co., Isabela, Basilan, P. I..... | 50.00 | Bruner, E. Murray, Rio Piedras, Porto Rico..... | 5.00 |
| Batcbeller, Robert, Washington, D. C..... | 25.00 | Bullard, F. F. (through E. D. Tennant)..... | 5.00 |
| Batson-McGehee Co., Inc..... | 10.00 | Burton-Schwartz Cypress Co., Burton, La..... | 100.00 |
| Baxter Lumber Co., Wildsville, La..... | 10.00 | J. H. Burton & Co., Washington, D. C..... | 50.00 |
| Bayou Land & Lumber Co., Yazoo City, Miss..... | 10.00 | Buschow Lumber Co., Kansas City, Mo..... | 10.00 |
| Beal, Mrs. James H., Boston, Mass..... | 2.00 | Butler, Miss Virginia, Stockbridge, Mass..... | 9.00 |
| Beckwith, Mrs. Daniel, Providence, R. I..... | 25.00 | Cabot, Mrs. William R., Boston, Mass..... | 4.00 |
| Beckwith, Isbon T., New York City..... | 10.00 | Caddo River Lumber Co., Kansas City, Mo..... | 10.00 |
| Beebe, W. M., Kansas City, Mo..... | 5.00 | W. M. Cady Lumber Co., McNarry, La..... | 100.00 |
| Beigham, L. F., Chestnut Hill, Mass..... | 12.00 | Calcasieu Long Leaf Lumber Co., Lake Charles, La..... | 75.00 |
| J. A. Bell Lumber Co., Lake Charles, La..... | 40.00 | The Caldwell Lumber Co., Oil City, Penna..... | 2.00 |
| Bellgrade Lumber Co., Louise, Miss..... | 10.00 | Cale, D. H., Wichita, Kansas..... | 5.00 |
| Bemis, H. C., Bradford, Penna..... | 25.00 | Carey, Arthur E., Boston, Mass..... | 5.00 |
| Bemis, J. M., Boston, Mass..... | 1.00 | Carpenter, Mrs. Charles J., New Brunswick, N. J..... | 4.00 |
| Berwick, Seth E., Chicago, Ill..... | 5.00 | Carrier Lumber & Mfg. Co., Sardis, Miss..... | 25.00 |
| Berwind, John E., New York City..... | 100.00 | Carter, E. T., New York City..... | 1.00 |
| The Blitmorean (by Mr. H. D. House, Albany, N. Y.)..... | 5.00 | Carey, Miss G. S., Boston, Mass..... | 2.00 |
| Birkle, John A., Williamsport, Penna..... | 3.00 | Case Fowler Lumber Co., Macon, Ga..... | 20.00 |
| Bissell, John H., Detroit, Mich..... | 10.00 | Central Lumber Co., Shreveport, La..... | 5.00 |
| Blackman, W. R., Los Angeles, Calif..... | 3.00 | Central Penna. Lumber Co., Williamsport, Pa..... | 250.00 |
| Blake, George B., Lenox, Mass..... | 25.00 | Chace, Fenner A., Fall River, Mass..... | 5.00 |

WILLAMETTE

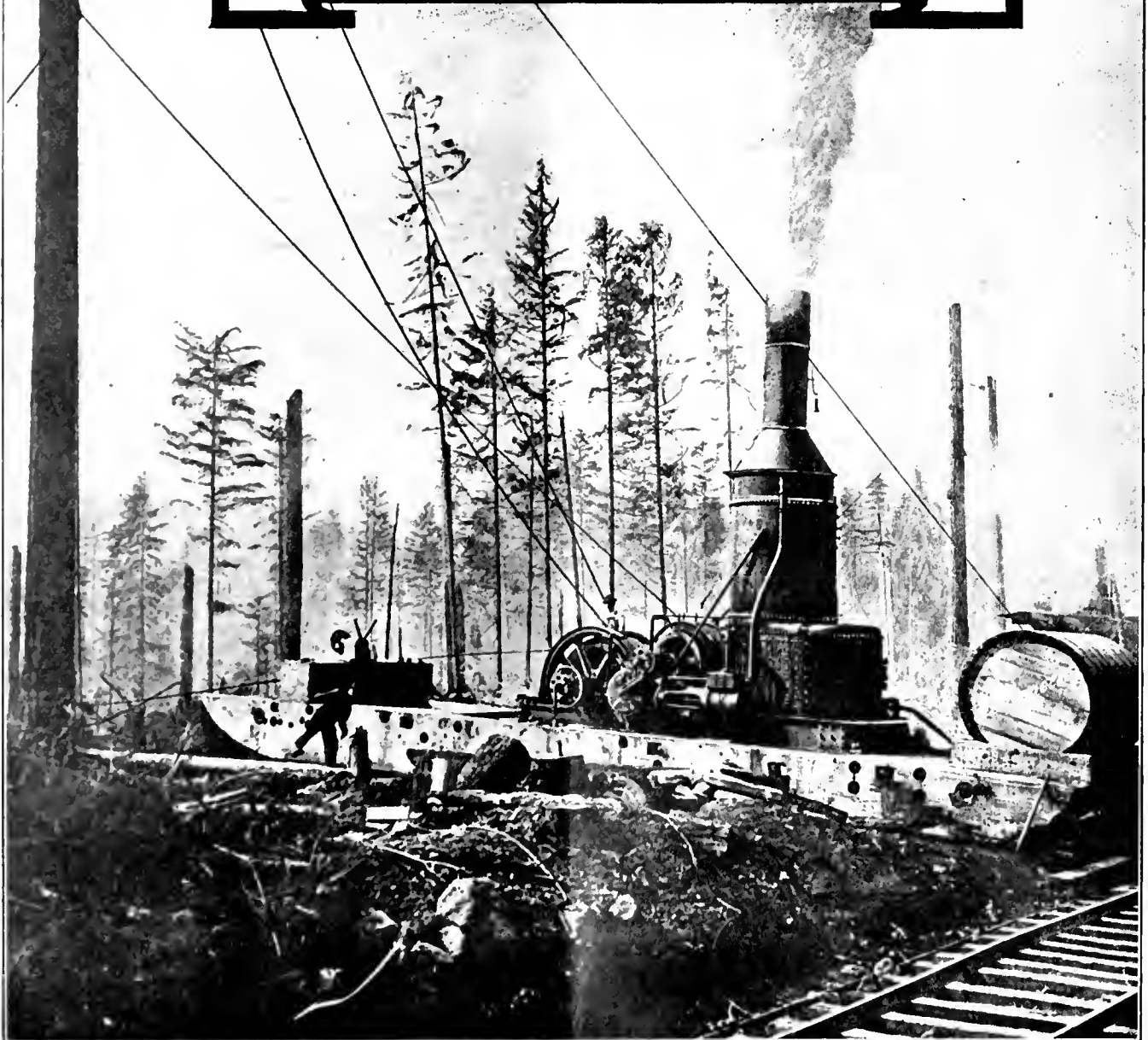
LOGGING DONKEYS

TO MEET particularly the severe conditions of large timber and rough country, Willamette Logging Engines have been developed. The complete Willamette Line embraces Ground Yarding Engines, Long-Haul Road Engines, Overhead Skidders, High-Lead Yarders and Two-Speed Engines. Their adoption by big operators speaks for their continuous, efficient performance.

WILLAMETTE IRON & STEEL WORKS

Manufacturers of Logging Machinery

Portland, Oregon - - - - - U. S. A.



Buy Yellow Pine Lumber Because It Is Good

NOT BECAUSE CHEAP

You wouldn't buy clothes or food on price alone? Then why do you let material go into your **home**, only because it is the cheapest?

There is a great deal of difference between well manufactured Yellow Pine lumber from high class forests, cut by responsible experienced producers, (who will continue in business many years) and the "other kind."

ASK YOUR DEALER

"Does the Yellow Pine Structural and Finish lumber going into my construction come from mills like these"

LOUISIANA LONG LEAF LUMBER Co.
Fisher, La. 2 Plants.
K. C. Southern R. R.
Victoria, La. 1 Plant.
T. & P. R. R.

FOREST LUMBER Co.
Oakdale, La. 1 Plant.
Mo. Pac. R. R. and Gulf Colorado &
Santa Fe R. R.

NOW BUILDING
WHITE-GRANDIN LUMBER Co.
Slagle, Louisiana
K. C. S. R. R.

LOUISIANA CENTRAL LUMBER Co.
Clarks, La. 2 Plants.
Mo. Pac. R. R. and T. & G. R. R.
Standard La. 1 Plant.
Mo. Pac. R. R.

LOUISIANA SAWMILL Co., INC.
Glenmora, La.
Mo. Pac. R. R. and Red River & Gulf
conn. with T. & P., R. I. and S. P.

Combined Capacity, 1,000,000 Feet Daily

Missouri Lumber & Land Exchange Co.

J. B. WHITE, Pres. and Genl. Mgr.

Long and Short Leaf Yellow Pine

QUALITY—SERVICE—CAPACITY

R. A. Long Building

KANSAS CITY, MO.





**USE
Victory
Bread
SAVE
WHEAT**

USE Victory Bread — save wheat. That's an important obligation with you now.

When you have it toasted—just right, and buttered hot, you'll find that this "substitute" bread has a lot more flavor.

Toasting brings out flavor—every time. It makes tobacco delicious. Try Lucky Strike Cigarette—it's toasted.

LUCKY STRIKE CIGARETTE

**It's
toasted**

Save the tin-foil from Lucky Strike Cigarettes and give it to the Red Cross

Guaranteed by

The American Tobacco Co.
INCORPORATED



THE SOUTHERN PINE ASSOCIATION

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| Fischer, Arthur F., Manila, P. I..... | 803.25 |

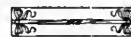
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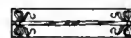
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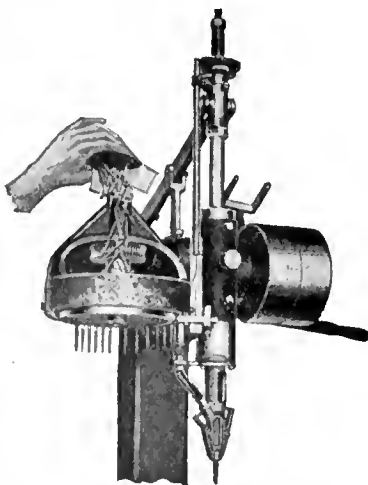
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