

SAVING THE SHAVINGS

by WILLARD G. BLEYER

OUR FORESTS will last but 25 years longer if we continue to cut them at the present rate, declares Gifford Pinchot, former general forester, and one of the best informed men on the forest problem of the country.

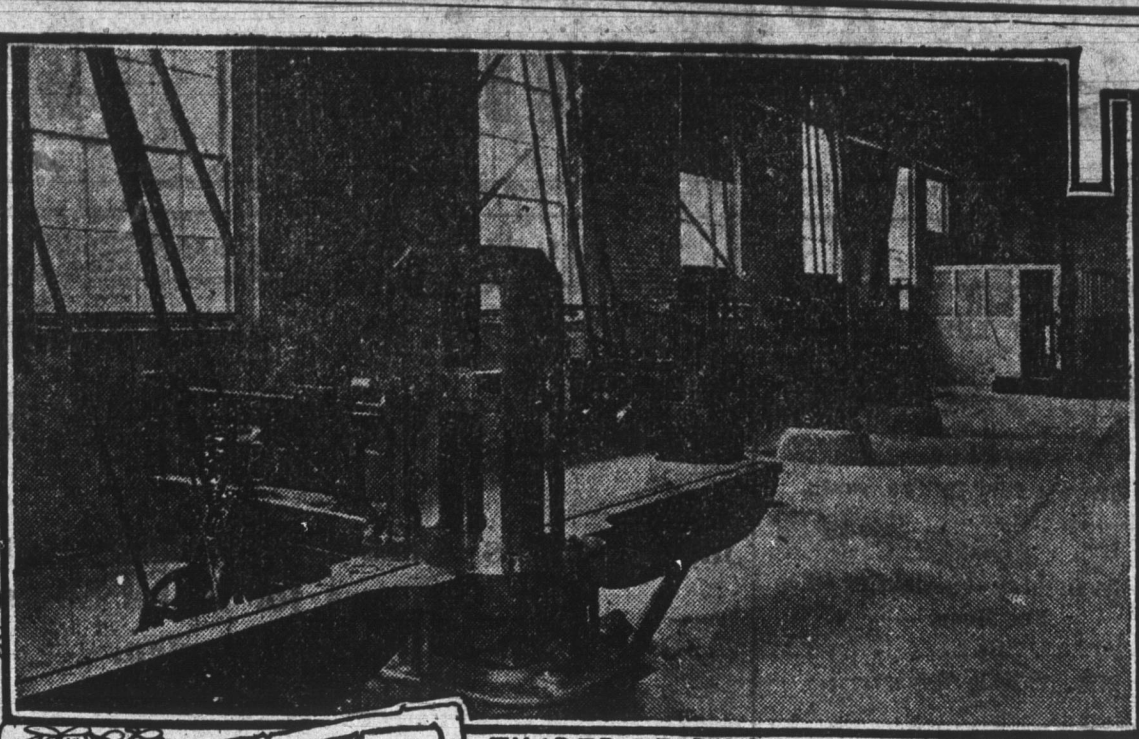
The increased cost of lumber, the scarcity of many kinds of woods, the high price of print paper, already bear witness to the forest famine that faces the United States. And still only one-third of every tree cut down is now being utilized.

Two-thirds of every one of the millions of trees felled annually, including the big stumps, the heaps of branches, cords of slabs and tons of sawdust are being destroyed, burned up to get rid of the so-called waste.

Incidentally burning over the slashings starts forest fires that destroy annually millions of feet of standing timber.

Now Uncle Sam is going to try to save the shavings and make cheaper print paper, wood alcohol, turpentine and other useful products out of the two-thirds of the tree that is now being thrown away.

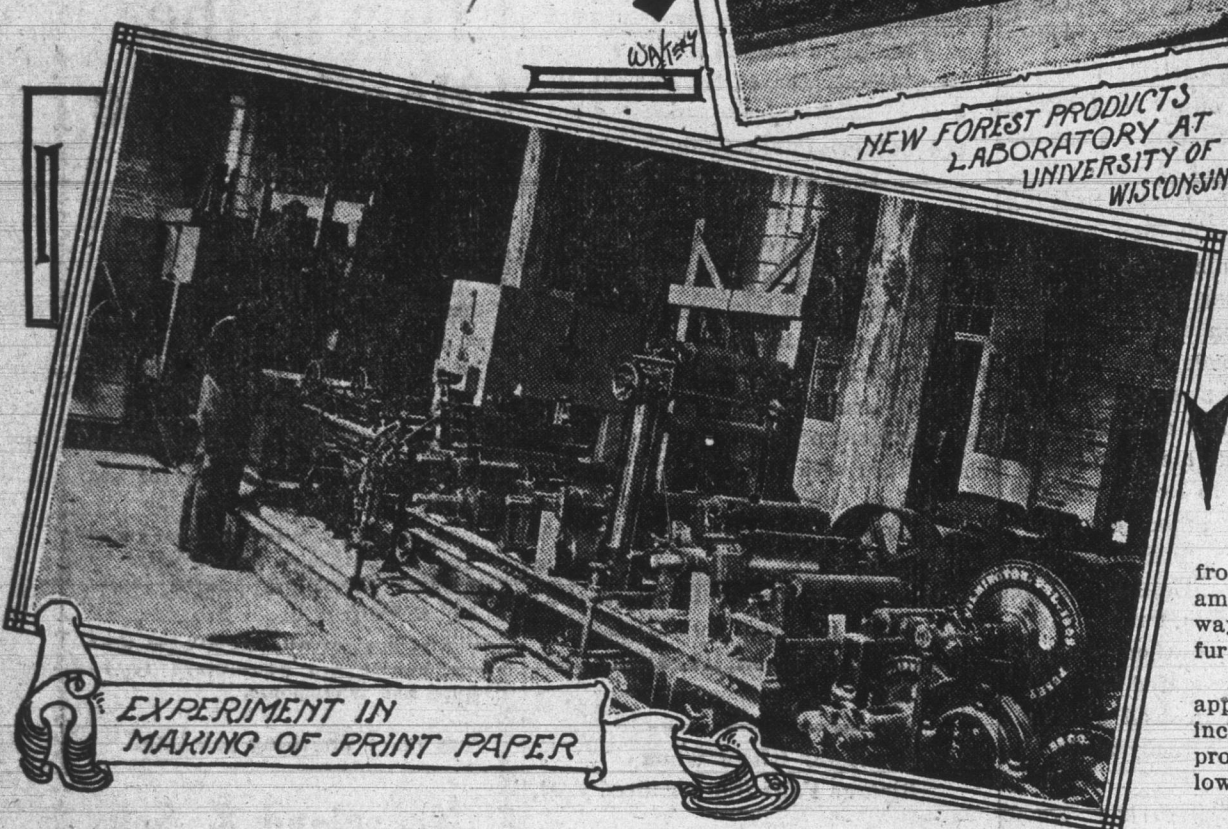
The United States forest service has just established a big experimental laboratory out in the heart of the middle west, at Madison, the capital of the state of Wisconsin, in connection with



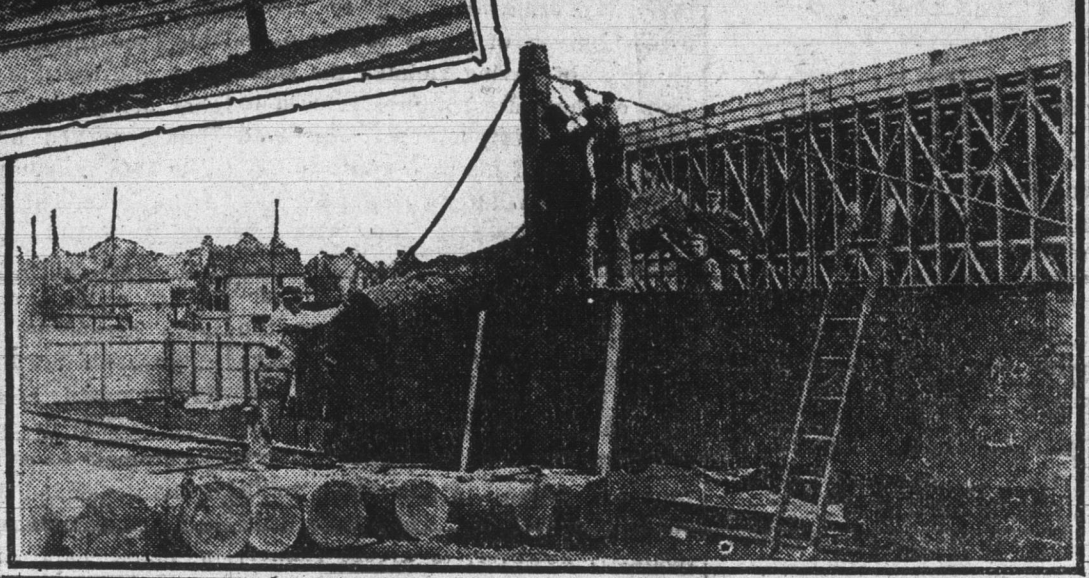
TIMBER-TESTING LABORATORY



NEW FOREST PRODUCTS LABORATORY AT UNIVERSITY OF WISCONSIN



EXPERIMENT IN MAKING OF PRINT PAPER



SAMPLE LOGS FOR THE LABORATORY

the state university, in which government experts will attack the problems of these forest products.

The new building has just been formally dedicated and the fine equipment of machinery and testing apparatus which is to make it the most complete laboratory of its kind in the country is rapidly being installed. The staff of some twenty government investigators has already arrived and been established in the suite of offices in the new building and for some months have been delivering lectures before the students of forestry.

In the new laboratory the United States forest service and the University of Wisconsin will co-operate, in the investigations which will be made to solve problems confronting the paper manufacturers, lumbermen, builders and others who deal with the products of the American forests. The building itself, which cost some \$50,000, and the site upon which it stands, south of University avenue, between Camp Randall and the Chicago, Milwaukee and St. Paul railroad tracks, were furnished by the university. The equipment was furnished by the government at a cost of about \$75,000 and the staff of investigators is also maintained by government appropriations. These men, in addition to their laboratory work, will deliver lectures in the regular forestry course of the university. The laboratories, too, although devoted chiefly to the government experiments, are open to the faculty and students for advanced research along the lines of study undertaken by the experts.

The laboratory, which faces north on University avenue, is a fine fireproof building of dark brown brick, trimmed with white Bedford stone and roofed with red tiles, with a 180-foot frontage and a depth of 80 feet. Immediately east of the building a private spur from the railroad carries the lumber into the laboratory yards. A derrick is to be erected north of the track for unloading the big logs and stumps for the experiments from the flat cars. Immediately opposite, south of the track, is to be installed a small sawmill with a saw which will cut timbers up to 20 feet in length.

Already logs of long-leaf, short-leaf and loblolly yellow pine have been sent in to the laboratories by lumbermen and paper manufacturers at Kenwood, La., Hattiesburg, Miss., Thornton, Ark., and spruce logs from the Maine woods. A number of fat pine stumps for the turpentine, rosin and alcohol tests have also been received.

Sheds for air drying the lumber line the west side of the yard, which is to be graded and covered with cinders. Immediately back of the building is a deep, cement-lined pit to hold the creosote to be used in experiments until it is pumped out into the laboratory tanks.

The problem of making a satisfactory print paper from materials other than spruce and hemlock is one which will receive particular attention, and for this purpose a complete paper making plant has been made a part of the laboratory equipment. Every process, from the breaking of the wood into chips for the first treatment by soda and sulphite solutions to the final running of the sheets of paper through the calendering rolls to produce a finished surface, will be followed carefully, so that the results of substitution of

various woods for the usual materials will be noted at each stage of manufacture.

Both soda and sulphate processes of treatment of the chips will be used and the laboratory will make its own sulphite liquor in a vat adjacent to the digestors, in which the wood is cooked by steam until the lignin is all dissolved and only the cellulose left. A blast of high-pressure steam drives the chips against the side of the digester, further dividing the cellulose fibers, and then the whole mass is pumped out by a centrifugal pump into a tank in which it is stirred until the fiber is still further broken up. Over and over it is run through "rifler" troughs and over screens where suction draws out the fiber to be used and leaves behind the small chips, splinters and other waste.

When the liquor has been washed out of it in a washer driven by an electric motor (a contrivance much like the housewife's washing machine) it is put into a press and the water is squeezed out of it. Such of the pulp blocks from the press as are not wanted immediately are then in convenient form to store away on shelves.

After going through the beating engines the refined pulp is run on to the screens of the paper machine and taken up by felt rollers, from which it goes to wooden rollers and then between metal rollers to the steam-heated drying drums, where the wet sheet is run back and forth until it is ready for the final smooth finish of the hot steel calendering rolls. Any grade of paper can be made on this machine, from the roughest brown paper to fine correspondence paper, in a running sheet 15 inches wide, and even a water-marking device is attached, so that the impression can be made on the wet sheet before it goes through the rollers and on to the winding drum at the end.

How to make timber last longer by protecting it with preservatives from the various borers and fungous growths which attack wood will be another important problem to which considerable time and laboratory space are to be given.

Beneath the building is a great pit, heated by steam to a temperature most favorable to rot, and there, in separate glass compartments all about the walls, are to be samples of timbers with the various fungous growths and animal and insect enemies of the wood attached. The progress of their effect upon the wood will be closely watched and compared with that of the same pests upon samples of the wood treated with different preservatives, prepared and applied in the room above.

A big skylight and many windows make the preservative laboratory an excellent place to work and every facility is provided for testing the various forms of preservatives and antiseptics to protect timbers, such as those in mines and water-front piers, which are much subject to the attack of minute animals and plants.

Into two great treatment cylinders the timbers are shoved and steam pumps force the oil from tanks above at high pressure into the cylinders. When no more oil will enter the cylinder, even under 150 pounds pressure per square inch, it is drawn off and again returned to the tanks and measured. The difference between the amount drawn off and that originally forced in, deducting the oil collected

from the vapor condenser, gives the exact amount absorbed by the timber, which is always weighed before and after treatment as a further means of calculating the oil absorbed.

In a small cylinder the preservative may be applied at a pressure of 600 pounds per square inch for smaller specimens and the resulting protection can be compared with that of the lower pressure preservatives.

Open tanks are provided for tests of preservatives that do not require pressure. These are heated with steam coils and an iron cage hung above lets the railroad ties or other timbers down into the hot oil. By a trolley arrangement the cage can be lifted and run across to other tanks filled with cold oil, so that it is not necessary to pump out the hot oil and replace it with the cold, as in laboratories where there is but one set of tanks.

All about the inner walls of the preservative laboratory are ranged shelves to accommodate the samples of wood for treatment and those already submitted to the different forms of protection against rot and other attacks.

What woods will best stand various kinds of strain, in bridges, buildings and different structures will be determined in the timber testing laboratory, where two seven-horsepower motors furnish the electric current to run the machinery.

In the torsion machine timbers can be twisted until the strain reaches 30,000 inch-pounds. Five "Universal" testing machines are provided to test the strength of different woods under slow pressure, one having a capacity of 100,000 pounds, another twice that, and three other smaller ones 30,000 pounds.

To see what sudden strains oak, pine, maple and different woods will withstand a Hatt-Turner impact machine was built in the machine shops of the Purdue university and sent to the forestry laboratory for experiments. It can be so gauged that the hammers, ranging in weight from 50 to 250 pounds, can be dropped from heights up to six feet upon the beam or block of wood, exerting a sudden pressure of hundreds of pounds.

In a laboratory where so much machinery is in constant use there must be facilities for instant repairs. For this purpose one end of the laboratory is fitted up into a machine shop. Here, too, much labor is saved by use of electricity to run the engine lathe, milling machine and other necessary apparatus. Beside the anvil there is a gas forge for heating and tempering steel.

The equipment of the wood shop, where timbers and samples of wood are to be prepared for tests, is very complete.

Steam heated ovens for drying wood, in order to test the shrinkage, warping tendencies and water content of different woods are a part of the laboratory equipment, and a portion has also been set off for a seasoning room.

In this connection, in another laboratory, tests will be conducted to discover the heat conductivity of different woods, to assist in the work of the kiln drying and preserving tests.

Stumps and other resinous portions of the trees now burned as trash will be put into stills and retorts and the turpentine, tar and gases will be extracted, carried off, separated and refined into the various commercial products. If methods of doing this economically can be fixed upon, the problem of utilizing much of the big pine trees now wasted will be solved.

All of the many chemical tests made necessary by the work of the different departments will be centered in a big chemistry laboratory on the second floor, where eight large windows on the east and south furnish admirable light, and eight stone tables, besides those running all about the room beneath the win-

dows, give room for the apparatus and experiments.

As some of the tests will produce strong fumes, there are tables encased in glass with hoods and ventilators above to carry off the smells and small doors through which the experimenters will work.

A corner room is set apart for special work in distilling turpentine and other products and special unlighted space is provided as a chemicals storage room. Still other unlighted spaces are reserved as photographic dark-rooms and record vaults for the safe keeping of the valuable reports of the work done.

One of the most interesting offices is that of the pathologist who has charge of the experiments with the fungi and other enemies of the woods. Upon his desk are large collections of glass tubes containing cultures of every sort of vegetable growth which feeds upon wood fibers, and samples of all the minute animalcules which attack timbers. Many he secured last summer in his visits to mines in different parts of the country, since one of the greatest sources of the dangerous mine cave-in is the destruction of supports by these little enemies.

A large drafting room, lighted from the north and east, a library and filing room, a lecture hall and a suite of 17 offices for the staff officials and their clerks and stenographers complete the building arrangements below and in the attic a space for storing materials which cannot be left in the open yard and which is reached by an elevator from the basement.

The government will appoint to regular work in the laboratory, as an addition to the present staff, several of the students who have been doing forestry work the past winter at the University of Wisconsin.

The forestry lecture course of the university, just closed, included this year, besides the regular work under State Forester E. M. Griffith, lectures by W. L. Hall, assistant forester at the Washington office; R. S. Kellogg, who holds a similar position; Franklin H. Smith, in charge of the wood utilization office of the government at Chicago; H. F. Weiss and H. S. Bristol, assistant directors of the new laboratory; L. F. Hawley, in charge of the wood distillation of the laboratory, and Frederick Dunlap, in charge of the kiln drying investigations.

At the time of the formal dedication of the laboratory the various departments of the government work were in full operation, that the visitors may see the actual work in progress—just how paper is made; how timbers are tested; how stumps are distilled, and how the little marine animals are prevented from boring through shipping.

The staff of the new laboratory is as follows: McGarvey Cline, Purdue '04, director; H. S. Bristol, Yale, and H. F. Weiss, Yale, assistant directors; H. D. Tiemann, Stevens Institute of Technology, in charge of technology; Ralph Thelen, University of California, mechanical engineer; W. H. Kemper, University of Michigan, in charge of maintenance; Edwin Sutermeister, Massachusetts Institute of Technology, in charge of wood pulp laboratory; E. Bateman, Yale, in charge of chemistry; L. F. Hawley, Cornell, in charge of wood distillation; Frederick Dunlap, Cornell, in charge of kiln drying operations; F. W. Bond, Massachusetts Institute of Technology, in charge of wood preservation; C. T. Barnum, Cornell, and C. P. Winslow, Yale, engineers in wood preservation laboratory; J. A. Newlin, Purdue, in charge of timber tests; H. E. Surface, Ohio State university, engineer in wood chemistry; H. E. McKenzie, University of Maine, engineer in timber tests; C. J. Humphrey, University of Nebraska and Cornell, pathologist, and A. W. Schorger, Ohio State university, chemist.

THE ONLOOKER

WILBUR D. NESBIT

The CAMERA SPORTSMAN



Here's a picture of a deer
That I snapped in Idaho;
Got him while the day was clear—
Caught him jumping through the snow;
Trailed him almost half a day
Till I got him focused right;
Had buck-fever, anyway,
When he first leaped into sight.

Here's an elephant I took
In Uganda 'way last year;
It's the best one in the book
So I pasted it in here.
Great big tusker! Oooh! I jumped
When he loomed in front of me,
Rather hazy picture—bumped
When I took it, 'gainst a tree.

This one here's a polar bear.
Yes, I think it's pretty nice.
Ugh! It's chilly 'way up there;
Nothing but the snow and ice.
When I pressed the spring he growled—
See the way his teeth are out.
Lordy! How my huskies howled,
Fairly itching for a fight!

This? A tiger. Say, I crept
Right up to him through the brush
And I snapped him while he slept
In the jungle's solemn hush.
Woke him up—and when he sprang
You'd have laughed to look at me.
Half an hour he made me hang
To the first limb of a tree.

Here's the best one. It's a haas
That I took out in the lake.
No. That whitish foaming mass
Is my screw-propeller's wake.
Huh? Why, no. The bass, you see,
Didn't seem inclined to stay.
I snapped quick as quick could be
But the big fish got away!

The Old Story.

The dashing young grass widow having joined the flock, she is the object of much interest at the first "experience meeting" after her accession to the congregation, and a full attendance is out.

There is a rustle of curiosity—or is it joyful interest?—when the leader of the meeting turns to her and says:

"And, now, Sister Gayleigh, will you give us your testimony?"

"I don't think there is anything I can add to what has already been said at the sewing circle, in the millinery store and at the afternoon teas," replies Sister Gayleigh, demurely. "It would simply be going over old ground to repeat it here."

Playing No Favorites.

"Now, officer," says the chief of the suburban police force, "I want you to go on the automobile patrol today. Be fair and just in your work, note carefully the speed of the machines, and arrest the violators, but do not lay yourself open to the charge of persecuting the automobilists."

That evening the officer reports having captured 56 automobilists.

"Fifty-six!" exclaims the chief. "Why, you must have grabbed them indiscriminately. However, that is a splendid record. Were you fair, as I told you to be?"

"Perfectly fair, sir. I pinched every third one of them. That gave them two to one the best of it, you see."

Evidently.

"Mrs. Coshus always buys two pairs of gloves at a time so as to be provided for any emergency," says Mrs. Fadoogus.

Mr. Fadoogus thinks the matter over and then with a bright smile he observes:

"She is what you would call a fore-handed woman."

"That's just what I intimated about her," replies his wife.

"But don't you see? That makes her four-handed."

However, even when he diagrams and explains it his wife argues it further.

Safe Prediction.

"I look for some mighty stormy times in June," says the man with the thoughtful eyes.

"Do you do your predicting on the Hicks system?" asks the man with the low-cut whiskers.

"No. As soon as my wife learns that I can't afford to let her go away for the summer the stormy season will be on in full blast."

That Foolish Question Again.

Happening upon our friend while he is concluding the purchase of a razor, we say, pleasantly:

"Do you shave yourself?"

"Of course, I do," he answers, with some heat. "Do you think I am a barber?"