

A FORWARD STEP IN FOREST CONSERVATION

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AN ADVANCE in forest conservation is realized in the establishment at Madison, Wis., of a thoroughly equipped wood-testing laboratory. Established on a cooperative basis by the Forest Service and the University of Wisconsin, the laboratory will be formally opened on June 4 with appropriate exercises. The presence of representatives of the lumber industry and of practically all the wood-consuming industries will make the occasion an auspicious event.

What is the need of such a laboratory? Of what value will its work be that it should be assigned an important place in the program for forest conservation?

Since the report of the National Conservation Commission we have had better information than ever before on the waste that occurs in harvesting the forest and in using its products. It was shown that so far as the tree is cut up into sawn products the waste is about two-thirds, if the bark and small branches be included. Let us look a little into the detail of this matter. It is important.

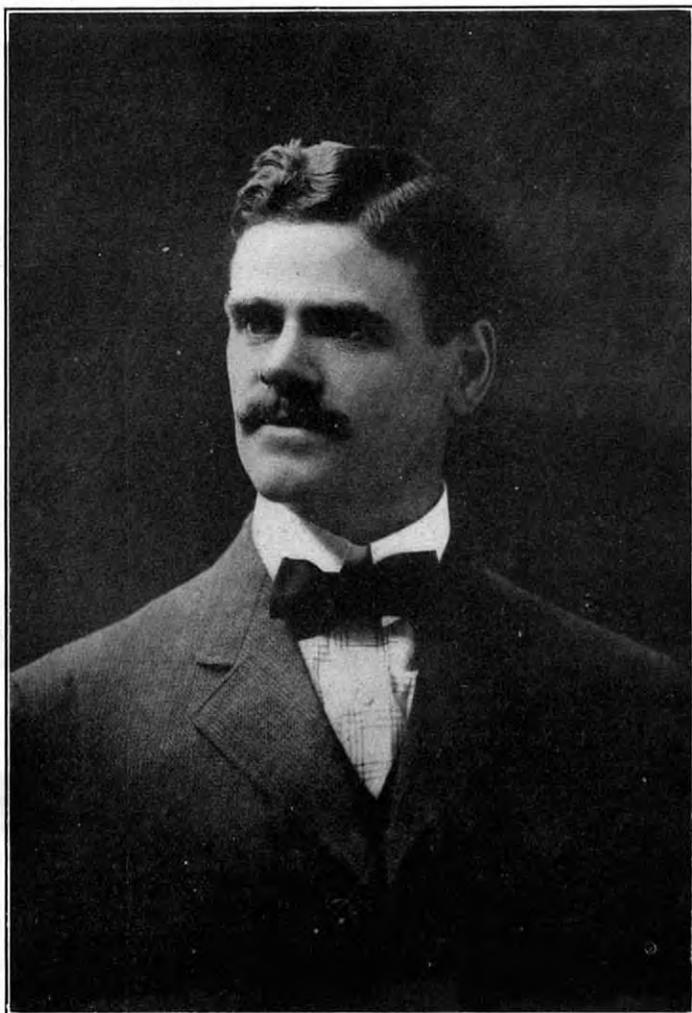
The wood which we cut down in the forest each year, if compacted together, would form a solid cube one-half mile square. It is taken from the forest by many industries. The lumber industry

takes forty-two per cent, cordwood thirty-two per cent, fence posts nine per cent, hewed railroad ties seven per cent, cooperage and pulpwood each two per cent. In manufacturing sawn lumber and its use by the industries, about sixty-seven per cent of the wood which grew in the tree is lost. In cordwood the loss is as low as five per cent, and in posts and rails it is only twenty per cent. In hewed cross-ties, however, the waste runs to seventy per cent, none of which can be used; and in cooperage stock waste reaches the enormous figure of seventy-eight per cent. Taking these several items which together take ninety-four per cent of the wood in the forest, we find that their combined waste amounts to thirty-eight per cent of the total. It is apparent, then, that considering the total amount of wood used, the waste approximates forty per cent, or two-fifths.

To aid in saving this vast waste is the work of one entire branch of the Forest Service, the Branch of Products, and it is the direct purpose of the Forest Products Laboratory.

PREVIOUS TESTS HAVE BEEN USEFUL

Now, the value of laboratory work in the economical use of wood has already been fully tested by the Forest



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Service. For several years small timber-testing laboratories have been conducted in cooperation with Yale and Purdue universities and the universities of California, Colorado, and Washington. Some excellent results have been obtained in determining the strength and other properties of our commercial woods. Wood-using industries and engineers have profited by the information thus obtained, and the tests of the

Forest Service now form the basis of the specifications used in several important industries.

Confined as it was to timber testing, the work of these laboratories was too much restricted to yield the most important results. Facilities were needed for chemical studies, for wood-fiber investigations, for experiments in preservative treatment of wood, but none existed.



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It is now five years since the first steps were taken to provide a laboratory in which all the necessary investigations involved in the use of wood could be made. An appropriation was requested from Congress, but was not secured. An attempt was made to lease a suitable building in Washington, but one could not be located. Contractors were found who were willing to erect a building such as was desired, but because a long-time lease could not be made, and because a building of the kind desired if vacated for its original purpose could be used for but little else, the proposed lease rate was so high as to make the project impracticable.

After considering many possibilities, we at last hit upon the idea of enlisting the aid of a university to secure the needed facilities. The matter was presented to several prominent institutions situated in the region within which it was considered advisable to locate the laboratory. Nearly all became interested at once, and three of them responded with very attractive propositions. These were the state universities of Michigan, Wisconsin and Minnesota. Not only were their propositions good, they became very eager to secure the prize. State pride was aroused. To decide between them was no easy matter. After careful and full consideration, the University of Wisconsin was



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selected as having made an entirely satisfactory proposition and as presenting on the whole the most favorable conditions for work such as the Forest Service intended to do.

By the terms of the agreement which was entered into, the University has erected a building at a cost of about \$50,000, and will supply free of charge the heat, light, water, and power required in the work. The Forest Service has supplied the testing machines and other apparatus and will furnish the force of forty experts and assistants to carry on the work. By this plan of cooperation the United States secures the largest and most completely equipped wood-testing laboratory in the world.

ORGANIZATION BY SECTIONS

As to organization and working space, the laboratory is divided into three groups of three sections each. The first

group employs processes that are largely chemical and may be designated the chemical group. In it are the sections of chemistry, pulp, and distillation. The section of chemistry devotes itself to the study of the chemical constituents of wood and the composition of wood preservatives. The section of pulp investigations studies the fiber characteristics of woods to determine their value for various classes of pulp. The immediate work of his section, for which Congress has made a special appropriation, is to determine whether it is possible to find a substitute for spruce in the manufacture of ground wood pulp. The section of distillation has the interesting and important field of developing chemical by-products of wood by distillation processes. Undoubtedly, this section is to have great direct importance in reducing wood waste because many of our commercial woods are rich in such materials as alcohol, turpentine, oils, and gums.



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The second group of sections may properly be called the physical group, and contains the sections of wood preservation, pathology, and wood physics. Wood preservation covers the study of the treatment of wood by substances to improve its durability or appearance. The treatment of wood to improve its durability is rapidly becoming an important industry, and in the future it will work a great reduction in the waste which takes place in use because of decay, insects, and marine borers. Many of its fundamental problems are yet to be solved, however, and on these the laboratory will work. Closely allied with wood preservation is the section of pathology, which studies the diseases which prey upon woods. By an

advantageous cooperative arrangement part of its work. The section of wood physics will investigate the microscopic the Bureau of Plant Industry will man this section and supervise the technical structure of wood and the relation between structure and physical properties such as strength, toughness, and penetrability to liquids.

The third group contains two sections, which rest substantially on mechanical engineering. It may, therefore, be called the engineering group. The first of these is timber testing, which aims to build up, through mechanical tests, a rating table for the properties of our commercial woods. By means of the figures, when secured, we may classify woods according to

their relative value for specific purposes. The second section is that of engineering, and has to do mainly with design work. Whatever is accomplished in cutting down wood waste in any line will depend in great part upon the efficiency of the machines which will be designed to do the work. This section is consequently a very important one. Third in this group is the section of maintenance, which looks out for the general maintenance and unimpeded operation of the laboratory.

Each section is in charge of a trained man who has under him the necessary assistants. Over all the sections, and in charge of the laboratory is the director, Mr. McGarvey Cline. He has as assistant directors Mr. H. F. Weiss and Dr. H. S. Bristol.

OTHER WORK OF THE BRANCH OF PRODUCTS

Correlated with the Forest Products Laboratory is the Office of Wood Utilization, with headquarters in Chicago. Its work is statistical, while the work of the laboratory is altogether experimental. The Office of Wood Utilization makes no tests, but is constantly gathering facts and figures which will promote economy in the use of wood. It makes studies of the wood-using industries of cities and states, learns their requirements, and aids them in finding supplies of cheap and abundant woods to take the place of scarce and costly ones. It finds out what the waste is and proposes methods for its reduction. It is also gathering a record of wholesale lumber prices at the mills and in the principal distributing markets. These are base lines run through the lumber industry, by which prices in one region or market may be compared with those in another, and by which may be determined in a broad way what influences operate to raise, lower, or hold steady the prices of lumber. This is a good thing, both for the public and the lumber industry. In charge of the Office of Wood Utilization is Mr. H. S. Sackett, with offices in the Fisher Building, Chicago.

The laboratory and the Office of Wood Utilization are represented by branch offices in Washington, Denver, San Francisco, and Portland, Oreg. These carry on the work in certain districts. The office which has administrative charge of all the several lines of work, already mentioned as the Branch of Products, has hitherto been in Washington, but on June 1 was transferred to Madison, from which place the assistant forester in charge will report to the forester in Washington.

All work conducted by the Branch of Products is done in close contact and cooperation with the lumbering and wood-using industries. It aims for practical ends which are linked with the processes of those industries and which can only be accomplished through the improvement of their processes. Consequently, it must keep in close touch with the industries to succeed at all, even in a minor degree. The industries do not resent this policy, but appreciate and favor it. They are anxious to see its objects accomplished. As an expression of their spirit in the matter, let me quote a part of a resolution adopted by the National Lumber Manufacturers' Association at its meeting held in New Orleans in April of this year:

"And, further, since the elimination of waste is as truly conservation as the growing of trees, we heartily approve the efforts of the government, through the Forest Service, to develop methods whereby material now wasted may be put to use, or for prolonging the life of forest products, and urge a continuation of such research and a liberal appropriation by the government for their support."

With this sort of spirit prevailing among the industries which are mainly concerned and with facilities such as are afforded by the new laboratory, it may be expected that valuable results will be accomplished. It is the determination of those who make up the working force that the great opportunity which is presented shall be improved to the fullest extent for useful work.