

Utilizing Forests to Double Their Value

By Robert H. Moulton



COLLECTING OLEORESIN BY THE OLD METHOD OF "BOXING"

Forest Products Laboratory hopes to bring about a saving of two billion dollars a year—it's a rather neat saving!

AID the Chicago pork packer: "We make our money by saving everything but the squeal."

Says Frank J. Hallauer: "The wood industries are going to go the pork packers one better; they are going to save everything, including the bark." And it is to teach the wood industry how to do this that Mr. Hallauer has been working for six years. Engineer of a little-known branch of government, the forest products laboratory, situated at Madison, Wis., Mr. Hallauer and his associates hope to teach this country how to save two billions of dollars annually.

He is confident that it can be done; that is, that the annual cut of wood, now valued at two billions, can be made into articles of use which at present prices would bring double that amount.

It is a man-size job, but the confident engineer points proudly to unbelievably vast economies already effected in the wood trades through the work of the forest products laboratory's chemists. They are in such terms that it would be hard to tabulate the exact savings, but there is little doubt that they run over \$100,000,000 a year.

Few persons outside the wood trades know of the laboratory, the first of its kind ever to be established, but which has been initiated in a number of countries since it began operation. Its annual appropriation is small for the work it does; something less than \$200,000.

The laboratory is now looked upon to save the paper situation of the country, and it cheerfully tackles the job. Only recently announcement was made in Washington that the laboratory had discovered that good grades of paper can be made from a number of far Western woods and that Wisconsin paper mills were already ordering trainloads of wood chips from the West for paper pulp. The cost of freight to Wisconsin is more than offset by the cheapness of the chips, and the paper thus made is expected to prove a considerable factor in relieving the paper famine.

A visitor who leaves Mr. Hallauer can scarcely believe that there is anything which cannot be made from wood.

"How about the cable story that the Germans have discovered a food they can make from wood which they are feeding to Russian prisoners?" was the first question asked.

"Almost surely not true," he said. "The human stomach cannot stand it. It is possible to convert sawdust into cattle food, and that was probably the foundation for the story."

But Germany from her forests is obtaining such great results that if, as an English writer recently suggested impractically, England were to destroy Germany's forests, the war would surely end very soon. Artificial cotton is one of the things which are being supplied from wood. Paper shirts are also being used, but then Japan is supplying these to the Russian soldiers.

Germany has been driven to extreme use of her forests by necessity, but no country with the exception of Germany has made such a systematic effort at developing forest products as the United States.

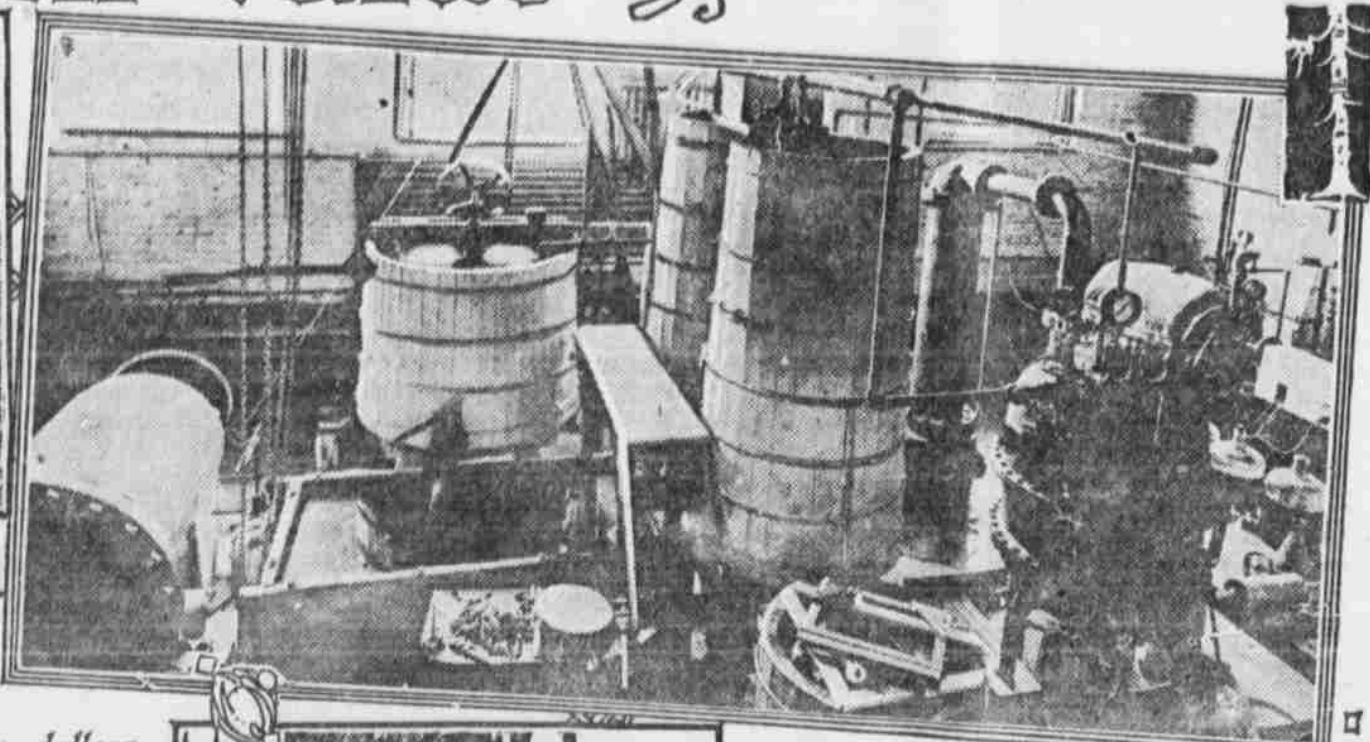
Charcoal for the manufacture of black gunpowders is being obtained from dogwood, willow and alder. Great quantities of alcohol and ether are made from imported molasses, but if we were cut off from this raw material we could depend upon the forests. Alcohol could also be made from grain, but in war times grain would be required for food. It is estimated that during the present year 40,000,000 gallons of denatured alcohol will be used at home, while huge quantities are being exported.

The use of wood for gunstocks is generally familiar. Our supply of seasoned black walnut, the most suitable wood for the purpose, has been entirely exhausted by the heavy demands of Europe. Heretofore the practice has been to let gunstock material air season for months before it would be worked up. Time became so important that artificial seasoning was resorted to, but improper methods destroyed too much of the material.

The forest products laboratory has now perfected dry kilns which overcome the trouble, and as a further aid is perfecting methods of using other woods, notably birch, for gun stock. Then there is the near relative of the gun stock, the wooden leg, making heavy demands for willow. Millions of feet of lumber and heavy timbers are required in war times for structural purposes, such as the erection of docks, bridges, trenches and temporary shelters.

Disinfectants are now a necessity. They can be made from wood. Pure wood alcohol is the only substance that can be converted into formaldehyde, universally used for disinfection against such contagious diseases as smallpox, scarlet fever, diphtheria and tuberculosis. It is also used to prevent crop diseases by disinfecting the seeds.

But the importance of forest products for war supplies in no way compares with their importance for industries. The largest of these are the lumber, pulp, and paper, naval stores and distillation industries. They employ more than



WOOD DISTILLATION LABORATORY

lowering the cost of production and raised the yield to such a point that the introduction of this alcohol as a motor fuel seems likely, particularly with gasoline going up as it has been. As Mark Twain said, "What chance has prohibition when a man can take a rip-saw and get drunk on a fence rail or drink the legs off the kitchen table?"

Western larch has an unusually high percentage of galactan, which it is believed can be converted into a fermentable sugar for use in making grain alcohol. This same galactan in oxidation yields large quantities of muric acid, and muric acid can take the place of tartaric acid in the manufacture of baking powder. A number of lumbermen recently visited the laboratory and one of the chemists made baking powder from wood, and his wife made biscuits with it. Another advance is the preparation of a fine, sweet sirup from galactose, a sugar derived from galactan. So if the people of Montana, the home of the Western larch, get hard pressed they can make their flapjacks with larch baking powder, bake them over a stove heated with larch alcohol and sweeten them with larch sirup.

Converting cellulose obtained from wood into a gelatinous material known as a viscose opens up another field for research and adds a new line of products running all the way from sausage casings to tapestry. Five million dollars worth of silk socks sold last year got their silk from wood, as did many silk neckties and fancy braids. Probably it won't be long before the whims of the silk-worm will have little control over silk market conditions.

Kraft paper is made from sulphate pulp, and the method of making it came to this country from Sweden ten years ago. Kraft is much stronger than other papers. It is brown, like what we usually think of as wrapping paper. Large quantities of it are used for that purpose and it is particularly suitable for large envelopes. Kraft is used for book covers, for imitation leather and for cardboard suitcases. An attempt is being made to produce a paper twine that will replace the binder twines now made from imported fibers. This question has become more active because of the recent shortage of these other fibers on account of the conditions south of us. A successful paper substitute would provide for the utilization of a large amount of wood waste and at the same time build up a home industry independent of foreign raw materials.

The problems put up to the laboratory to solve are many and complex. One man in the frog business was suffering heavy losses from the death of his tadpoles. He asked the laboratory to find out if there was anything in the wood which when washed out poisoned the tadpoles.

The government chemists undertook to study the matter. They could not locate the trouble, so it was put up to the section of timber tests. After a few experiments it was found that the resonant croaking of the large frogs produced vibrations in the boards of the tanks. The vibrations were transmitted through the water to the ganglia of the tadpoles (they have no brains), causing a disease somewhat akin to infantile paralysis.

The remedy was simple. The man was advised to separate his tadpoles from his large frogs, thus confining the vibrations to the older generations. This was done and the mortality among the tadpoles decreased wonderfully.



IMPROVED METHOD OF COLLECTING OLEORESIN

Lumbermen and farmers. Their products are valued at \$2,000,000,000 annually.

The most promising and novel developments in the line of by-products from wood are in the nature of chemical utilization. It might be said that the chemists of the forest products laboratory have put the prod to forest products. The lumber industry draws upon the forests for many times as much material as do all the other industries, and only about one-third of the tree cut for lumber is actually put on the market in that shape.

Right here is more than enough waste, although not often in the right form or readily available, to supply raw material for all the other industries. The problem now becomes one of adopting means of utilization to suit the conditions. Years ago wood ashes were leached for home soap-making, to furnish potash. The practice disappeared. It is now being revived as a source of potash to offset the shortage of fertilizer due to the war.

In the Red River valley of Texas the Indians used to use Osage orange for dyeing, but that wood never gained commercial recognition as a dyewood. Within the last year, however, we have succeeded in getting it into the market as a substitute for fustic, which we import from Jamaica and Tehuantepec, and more than \$1,000,000 worth of these dyes is now being made by American manufacturers.

The forest products laboratory has just completed an analysis of the oils which can be obtained from the needles or leaves of all the coniferous trees of the country. From a number of species the oils obtained have very attractive odors; other oils can be used in greases and shoe blackings. In Europe the finer needle oils are used as perfumes in soaps; others are used for inhalations for lung diseases.

It has been working on the production of alcohol from wood for five years. It has succeeded in

SPY ON FRENCH CHILDREN.

One of the most interesting examples of how specialized spy work is shown by the way Germany has her secret service organized in the conquered portions of Belgium and northern France.

German officers have found by experience that the men and women who are left do little talking outside of selected groups where they know everyone can be trusted. But, often, the invaders learned, these citizens forgot themselves when they are talking before their children. So Germany sent experienced schoolteachers, men and women who understood child psychology and who could speak French, to the occupied cities and towns to open French schools. When it is possible the teachers win the good will of the children, and through the innocent boys and girls learn what the parents are thinking and talking about. —Carl W. Ackerman in the Saturday Evening Post.

Summer Discussion.

"What's dem summer clothes you all is wearin'?" inquired Mr. Erasmus Pinkley.
"Dat's Palum Bench suit."
"Pallum bench! Mebbe 'tis. But it looks mo' like Coney Island to me."

Making the Useless Useful.

Cholly—Er, I say Miss Ethel, I—er—hem—
Ethel—Oh, do you. Then I'll set you to work hemming sheets for the soldiers.—Boston Evening Transcript.

Sarcastic.

"George knows human nature all right."
"Why?"
"Yesterday he said to me: 'Has your wife planned your vacation yet?'"

AIRPLANE COMPASSES.

Of the thousands of inventions relating to the war which have been filed in the patent offices of the United States and the countries of the entente allies in the last three years many have been for compasses for airplanes. The points aimed at particularly have been the elimination of errors that result from tilting and banking. The problems are complex and have been studied for years, as the troubles worried users of compasses long before airplanes came into the world.

The military value of a perfect compass for an airplane would be great. With such an invention flights on cloudy night would be comparatively safe and aviators could reach predetermined objectives without much regard to land bearings. At present, when he cannot see land or anything else, the airman practically has to feel his way to a large extent.

His Wife's Little Sht.

"I'm glad you're over the draft a—"
"Why?"
"Think how humiliated I should be to have to admit that I was dependent on your stinky sale every week for my living."—Detroit Free Press.

Sure Way.

"What is a good way to get rid of angle worms in a garden?"
"The best way I know is to plan a fishing trip. There won't be a worm there when you go to look for them."

New Reading.

"The old proverb says uneasy lies the head that wears a crown."
"Yes, because it can't find a good way to cover the lies up."

WHO IS WHO NOW

SEES TASK FOR UNITED STATES

Lands of untold wealth, with more hidden and interesting secrets than the human mind ever dreamed into fictional existence, remain for the enterprise of the explorer, says Sir Ernest Shackleton, who braved the dangers of the southern pole. In one of the most interesting interviews of the entire war period he outlines what things remain to be done after the war, and how far the daring investigator of the future may hope to go.

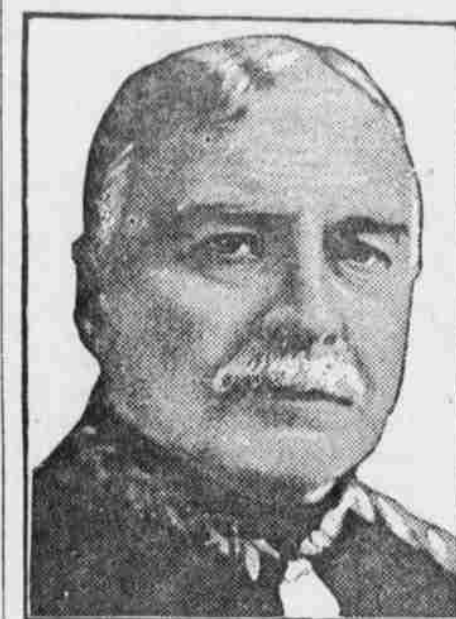
Sir Ernest is confident that when the war is over the spirit of daring and adventure that has brought men from all lands to seek excitement on the battlefield will lead them to strike for new trails, and to look for new thrills in the field of exploration.

For the United States, he cut out a program that is vast. Her task, he says, must be the exploration and development of Mexico. The man who nearly lost his life in the southern snows asserts that Mexico is endowed with more wealth than any other land in the world, and that it is for America to go into the treasure house and turn the light of civilization upon her dazzling store.

Marvelous rivers in Russia that have hidden secrets a thousand miles from the sea, dense fastnesses in Africa that hold wealth and interest, and forests and mountains in South America all have the most glorious deposits that can only be drawn by the man who has the hardihood to brave the dangers of the pioneer.



FAMED AS SOLDIER TRAINER



Brig. Gen. James Parker, commander Southern department, was born in New Jersey February 20, 1854, and appointed to the military academy from that state in 1872. In 1876 he was made a second lieutenant in the Fourth cavalry, and has continued in that arm of the service except during the Spanish-American war, when he served in the infantry, with increased rank.

General Parker is looked upon as possibly the best trainer of troops in the United States army. During his many years of active service he has probably trained more new men than any other officer in the service, and in a similar capacity he is expected to accomplish great results from the new National army. He is a medal of honor man.

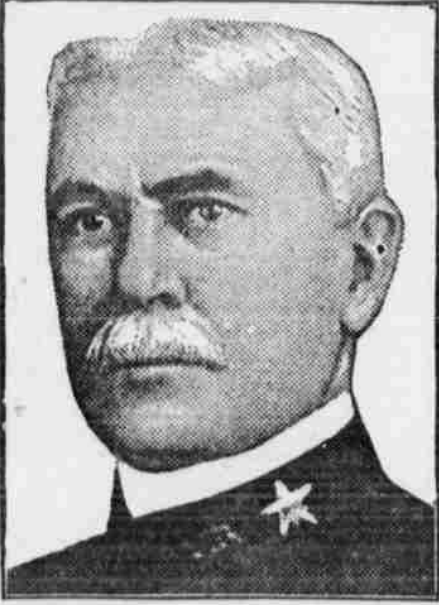
He has been stationed on the Mexican border for a number of years and until recently served under General Bell at El Paso, and did excellent work in suppressing rebel bands operating in his command. He is commander at the Southern post, with headquarters at Fort Sam Houston, San Antonio, Tex.

SLATED FOR BRIGADE COMMAND

Brig. Gen. Francis J. Kernan, assistant chief of staff, was born in Florida, October 19, 1859, and appointed to the military academy in 1877. Upon his graduation in 1881 he was made a second lieutenant and assigned to the infantry, in which arm of the service he has served continuously. He served on the general staff from 1905 to 1909 and was assigned to the Army War college in 1914.

General Kernan is one of the "war generals" recently promoted when congress authorized the raising of the National army and when Maj. Gen. Hugh L. Scott, chief of the general staff, was placed at the head of the military mission sent to Russia. General Kernan was brought to Washington and detailed as assistant to the acting chief of staff, Major General Bliss.

General Kernan first commanded recognition when serving as chief of staff under Gen. Arthur MacArthur in the Philippine islands, and since his service there has been recognized as a most efficient officer, and it is predicted that when relieved of his present detail he will be placed in command of one of the brigades to be sent to the battlefields of France. In that event those who serve with him may be sure of having an efficient commander.



UNCLE SAM'S CHIEF MUSICIAN



Lieut. John Philip Sousa of the Naval Reserve is one of the most active men in the United States just at present. The government has commandeered his ability for building bands and is using it in the creation of military musical organizations which will serve with the American forces. The huge Naval Reserve band at Great Lakes, near Chicago, was organized by Lieutenant Sousa, and the eyes of the accomplished band leader sparkle with delight as he describes this wonderful body of young men who are making music for Uncle Sam. There are 250 members in the band. When they turn out in force, clad in their snow-white uniforms, they are everywhere greeted with rousing applause.

During a recent tour in Canada at the head of his own band Lieutenant Sousa found that a large proportion of his audience consisted of wounded Canadian boys who had been sent home from France and were convalescing. In Toronto he played to an entire audience of wounded soldiers. He noticed two boys, one of whom had lost a right arm, while the other had lost a left arm, standing side by side during the concert. When these boys were particularly pleased with a number they would demonstrate their appreciation by clapping hands, one using the right and the other the left hand.