Utilizing Forests to Double Their Value

by Robert H. Moulton

COLLECTING OLEORESIN BY THE OLD METHOD OF "BOXING"

WOOD DISTILLATION LABORATORY

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

All 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 in an unheard-of 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 imitated 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 cabled 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, diptheria 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

IMPROVED METHOD OF COLLECTING OLEORESIN

lumber camps. 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 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 ripsaw 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 mucic acid, and mucic 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 biscuit with it. Another advance is the preparation of a fine, sweet syrup 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 syrup.

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 silkworm 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.

SPY ON FRENCH CHILDREN.

One of the most interesting examples of how specialized spy work is 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.

"Whut's dem summer clothes you all is wearin'?" inquired Mr. Erastus Pinkley.

"Dat's Palum Beach suit."

"Pallum beach! 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 Shot.

"I'm glad you're over the draft age."

"Why."

"Think how humiliated I should be to have to admit that I was dependent on your stingy salary 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."

Temperance Notes

(Conducted by the National Woman's Christian Temperance Union.)

"WHY KILL THE GOOSE?"

A cartoon issued by the publicity department of the liquor traffickers is entitled, "Why Kill the Goose?" says Prof. John A. Nichols in the Union Signal. It represents a fat goose, labelled, "Internal Revenue." Its three eggs are very conspicuous, but an ax marked, "Prohibition," is in dangerous proximity to its neck. Well, there are many reasons why the goose should be killed. In the first place, the cost of feeding it is too great. What would you think of a farmer that kept a flock of geese at a cost ten times greater than the amount realized from the eggs produced? If, when his attention had been called to the matter, he tried to defend his position by telling you how much he obtained from the sale of the eggs, and spoke of it as a profitable transaction, you would at once consider him a fit subject for some kind of mental treatment. For many years Uncle Sam has been that kind of farmer. But skillful mental treatment, in the form of scientific and economic facts, having been administered to him for some time, he is beginning to show signs of sanity, and we hope ere long this expensive and dangerous goose will no longer find pasture on Uncle Sam's farm.

PROHIBITION PROHIBITING.

From The State, daily newspaper of Columbia, in dry South Carolina, comes this testimony: "For weeks the city has been thronged, especially at night, with workingmen, many of them white and hundreds of them negroes, but there is little or no evidence of disorder and practically none of drunkenness in the streets.

"With the country engaged in war and with the nerves of the people at high tension, with money abundant, with soldiers better paid than ever before, with wages high and with an immense transient population, the Columbia of 1917 presents such a contrast to the Columbia of the Spanish-American war that those who remember that time could hardly believe it to be possible if they did not see it before their eyes.

"What the future of the whisky traffic shall be it is not worth while to discuss, but it is the simple truth that prohibition is prohibiting and the old argument to the contrary, so long relied on by the whisky dealers, is, for the present at least, discredited. Whoever says that prohibition will not prohibit is heard with derision."

POT CALLS KETTLE BLACK.

The Brewer and Malter: The reason why a beer saloon is a success is because a man can drink a large quantity of beer without getting drunk. He can stick around and talk or play cards for the greater part of an evening and go home sober. He cannot do that and drink whisky. That is why a whisky saloon is not a success.

Midas Criterion (champion of distillers):

Any man who has had any experience in drinking knows it is possible to get exactly as drunk on beer as on whisky. If we were to decide between the merits of the beer drunk and the whisky drunk, we would say candidly that the mushiest and sloppiest kind of a drunk in the world is the beer drunk.

PIANO SALES INCREASE.

According to traveling representatives of Eastern piano manufacturing converns who have recently been in San Francisco, says the Musical Times, piano sales in the western states that have joined the dry ranks show marked increase. They report that business in Colorado, Arizona, Washington and Oregon was never better and that retailers, many of whom opposed prohibition, are now heartily in favor of the change. More pianos are being sold, it is asserted, initial payments are larger, collections are much better and fewer instruments are returned.

IN THE CITY OF SEATTLE.

The prohibitory law of the state of Washington went into effect January 1, 1916. Of buildings occupied the last day of 1915 by 211 saloons, ten are now occupied by drug stores, haberdasheries, women's specialty shops and the like; 56 by cigar, candy and soft drink places; 14 by groceries and meat markets; six by confectionery stores; 19 by cafes, bakeries and the like; 20 vacant for repairs, or because building is too poor for business.

A GOOD RULE.

The law for the soldier and the law for me
Are not the same, but they ought to be.
To him it says: "No whisky or beer."
Who'll say the same while war is here?

Seeing God Through Nature.

If I knew all that is to be learned from a daisy even, I should be less a stranger to God that I am. All about me, tree unto tree is uttering speech, and flower unto flower is showing knowledge. It is in a language I do not understand, but which I shall remember, and which I shall learn the whole meaning of, hereafter.—William Mountford.

No man minds, or ought to mind, work's being hard, if only it comes to something.—Ruskin.

MOVING DAY.

By ISABEL FROST.

It had never occurred to Alice Barton that Mr. Paxton, her landlord, would not trust her indefinitely, even though she had not taken the time to apprise him of her intentions. She had meant to drop in the office on her way to the station and tell his slave at the desk that they might renew her lease; but it was pouring pitchforks, and she had to make a train; therefore she trusted to luck and the landlord's intuition.

When she returned on May 1 she encountered large packing cases in her hall, also a young man in shirtsleeves wrestling with the same.

"I'll have these out of the way in just a minute, so you can get by," he told her, pleasantly.

"But I don't want to get by," said Alice frigidly. "Thank you. I merely wish to get into my apartment."

He looked at her in surprise.

"There seems to be some mistake here. I rented this apartment under the impression that it was vacant," he explained. "From May 1 for one year. I'm just moving in."

Alice's face turned a shade paler. Manners were instinctive second nature to her, and she forced herself to speak very quietly.

"May I phone the office?" she asked, a bit helplessly.

Paxton's voice was suave but firm. He reminded her that they had written several times, inquiring her intentions on the renewal of her lease, and she had calmly ignored them.

"Have you anything else left in the building?" she asked.

"No, I am very sorry, but there is nothing at all left. We waited until the very last moment for your decision, but Mr. Reeves wished the apartment on the first, and we accommodated him. If there is anything that we can do—"

No, there was nothing they could do. She thanked him and hung up the receiver. Drawing off her gray suede gloves, she looked around her a bit tiredly.

"I'll pack up my things right away," she said.

"You won't do anything of the sort. I shall not retain the apartment," he told her resolutely. "It was beastly of them to rent it without your knowledge. I'm going to throw the whole thing up."

"But you can't, you know. Not if you've signed a lease." She laughed rather wearily. "If you don't mind, I think I'll make a cup of tea for myself before I pack my dishes. Won't you join me?"

Before the impromptu tea was half over, she made several enlightening discoveries. First, Mr. Reeves was a Yale man, the same class as her brother Tom. This in itself would have warranted her in accepting almost any favor at his hands. The time slipped away while he told of Tom's initiation into their fraternity, and then she found herself reading to him Tom's last letter from France, where he had joined the aviation corps.

"Of course, you understand," he told her, when they had finished tea, "that I can't possibly let you go out of here. If they won't let me step down and out, I shall sublet to you."

She wrote to Tom, telling him of the accidental meeting, and asking him if he remembered Dick Reeves, class '13, Yale. The answer did not come back for nearly two months, and in that time Dick had securely established himself as a landlord who bestowed remarkable attention upon his tenant. He called frequently.

Then came the letter from Tom. She never forgot the moment when she opened it, just after Dick had gone.

"He's one of the finest old chaps I ever met, but he got into a mix-up at college with a girl who blew into town with a road show. I guess she was a square little kid, all right, for she never tried to hold Dick, and told him he was making a fool of himself for nothing. His old man went mad over the affair and cut Dick off without a cent. He stuck it out, though, working his way through his last year, and took his degree. I don't know what became of the girl. I believe he's working now in his cousin's automobile factory, learning the business from the ground up. I'm mighty glad you've met him."

It was two weeks later. He sat on the window-seat looking down at Gramercy park. "Alice," he said suddenly, with a touch of desperation in his tone, "I've got to tell you something. Something I'm mighty ashamed of, now that I've met you and known the real thing. Maybe I'm wrong, but it seems to me you ought to know before I ask you to be my wife."

Alice bent a little lower over her embroidery as she sat in a dark-green willow chair beside him.

"I've heard all about Peggy," she said, quietly. "Tom told me. I like you much better as a worker, Dick, than as you must have been before she switched your life into the manlier way of independence. Was that all?"

She glanced up at him with a little mischievous smile of inquiry, and Dick left the window seat.

The following morning Mr. Paxton glanced up from his desk. Dick's tone was very decisive.

"We wish a few alterations made in the apartment, Miss Barton and myself. We will be married on the 19th, and it will have to be in shape by the time we get back from our honeymoon."