

Chemists Strengthen Low Grade Lumber, Promise Profitable New Field for Farmers

Treated Wood Almost Hard as Metal.

By BARROW LYONS
(WNU Washington Correspondent.)
The alchemy of modern chemistry suddenly has prepared a new field of profit for farmers. By the use of relatively inexpensive equipment and by the application of certain cheap chemicals, ordinary soft woods can be transformed into material of almost any desired hardness and color.

Not only does this multiply the uses for which wood may be used in building and furniture manufacture, but opens possibilities for its use under conditions of pressure, humidity and moisture that formerly only metals and plastics could satisfy. Also, the decorative value of many woods can be vastly enhanced. And fast growing species of trees, use of which was formerly limited, can now be grown like crops to replace the slower growing varieties.

These facts were revealed recently by Dr. J. F. T. Berlinger of the ammonia department of E. I. du Pont de Nemours and company, who recently told a group of scientists and writers about the development of the chemical called methylolurea, the reagent which transforms the inner structure of wood into new substances.

The chemicals used in this process cost only 3 1/2 cents to 4 1/2 cents per board foot treated, although the cost of equipment and labor will add to that figure in producing the new product. For the average veneer the cost of chemicals used amounts to less than two-tenths of a cent per square foot.

This development assumes unusual significance in view of recent efforts of the department of agriculture to bring about a new realization of the potential importance of the woodlot to the farmer. John F. Preston, U. S. soil conservation service, estimated a few weeks ago that the income to farmers from farm woodlands could be increased to \$500,000,000 a year, or more. The discovery of the Du Pont chemists may considerably raise this estimate.

Income from Woodlot.
"Farmers are interested in woodlands not only as sources of income with which to pay taxes, buy seed,

west, and New Jersey, Pennsylvania and New York on the east. Three and one-half million acres are considered desirable for shelter belts."

The soil conservation district program, under which the farmers themselves decide what lands are suitable for woodlands, today offers a practical opportunity for giving the Du Pont process a real tryout. By means of the process, wood can be made for the manufacture of doors, windows and drawers that will not swell and stick, or contract and become loose. Wood can be made strong enough to substitute for even steel in certain machinery parts. In a few days machinery that would normally take a century to grow, can be made at small expense.

Poplar becomes harder than hard maple, which in turn can be made



Impregnating apparatus in the Du Pont experimental laboratories is rather simple. The wood is placed in the horizontal cylinder. The overhead tank contains the solution of methylolurea, which flows down and impregnates the fibers of the wood. A vacuum is first created in the cylinder, then pressure.

harder than the hardest tropical woods. The compressive strength of wood is so increased, and other properties imparted, that in fact a new material is created, which can be called "transmuted" wood. By this process, near-at-hand species of woods that grow on your own woodlot can be made as useful as the costlier, scarcer varieties, many of which are imported from distant lands.

Won't Warp or Shrink.
Furniture made from the transmuted wood can be shipped throughout the world to humid tropics or dry areas with assurance that it will not warp, swell or shrink. A built-in finish is imparted so that scratches may be removed by simply smoothing and rubbing. By mixing dyes with the impregnating chemicals, light-colored pine may be given the color of cherry, mahogany or ebony; or the wood may be made green, purple or any bright color throughout.

Veneers sufficiently treated become self-bonding, requiring no adhesive to be formed into plywood, since heat and pressure fuse the product into a hard, dense substance. Even sawdust, shavings and similar woodwastes may be moulded into articles with dyes incorporated. Methylolurea—pronounced methyl-ol-urea—is compounded by adding urea to dimethylolurea. Both materials are white and soluble in water. They are produced from ammonia, carbon dioxide and methanol, which are synthesized from coal, air and water. Urea results from the reaction of ammonia and carbon dioxide. Formaldehyde, which is derived from methanol, condenses with urea to form dimethylolurea.

These chemicals are being produced cheaply on a large scale, but are under allocation by the war production board. Small quantities for investigation and preliminary tests, however, can be obtained without formal allocation. After the war large quantities can be obtained.

The equipment required may be quite simple. In fact, most of the apparatus now used in impregnating wood with various substances, such as creosote and flameproofing chemicals, can be adapted with minor alterations. Because of shorter treating periods, however, smaller scale equipment can be used. An ingenious mechanic who understood the principles of the new process could rig up equipment from elements on hand in most plants, the chemists declare.

Equipment Simple.
All that is required is a chamber capable of withstanding the neces-

sary vacuum and pressure in which the wood is placed. A steam jet ejector is an effective, simple means of producing the vacuum. The chamber should be equipped with a pressure door or removable head, and with a source of vacuum and of pressure. A tank for preparing the solution, an auxiliary overflow tank, and means for drying the wood are also needed. Mild steel equipment may be used.

The chemicals are no more corrosive than water, and are neither flammable nor poisonous. To prevent rusting, it is desirable to apply a waterproof finish to the exposed surfaces of the equipment. This type of equipment could be set up and operated in almost any lumber handling concern throughout the country.

A chemical change takes place in the actual fibers of the wood under treatment. Methylolurea in solution enters the wood structure. In the course of drying it gradually reacts with itself and with the components of the wood, first to form insoluble but fusible products. Given sufficient time or heat, the reaction is completed and an infusible product results. If the wood is subjected to sufficient heat and pressure while the resin is still in the fusible stage, the resin will melt, flow and allow the wood to compress. This treatment converts the resin to the final infusible form, maintaining the wood

in the dimension resulting from the press. Thus, treated wood may be compressed to produce a stable, extremely hard, dense product with a consolidated closed surface requiring no filling, sanding or polishing. It is possible to apply moderate pressures sufficient to compress and consolidate only the surface or outer zone of the treated wood to produce a hard finish. If polished or embossed platens are used, these finishes can be reproduced on the surface of the wood. As far as is now known, the treatment does not have any adverse effect on the gluing and finishing characteristics of the wood. Flame resistance is improved, and the wood is also more resistant to fungi, rot and pest infestation.

But from experiments made in Du Pont laboratories, it appears certain that a process has been developed which will give new value to the trees standing on every farm woodlot. That should give an impetus to reforestation of many marginal farms, bringing back a woodland

Cleanliness around the separator is essential.

Deep Tillage Drains Off Swamps and Water Holes
"Water holes and temporary ponds on many farms can be drained by deep tillage practices, which include the heavy application of lime on the surface or in the subsoil," advises C. M. Nissley of Rutgers U. "This makes conditions favorable for deep-rooted crops which help to open up the soil."

The practice would not be applicable to fields where the surface soil is underlain with three or more feet of clay, however. Because of this, Nissley suggests that a hole three feet deep or deeper be dug in order to find out the character of the soil formation before remedial measures are put into practice. He also suggests that the county agricultural agent be consulted for additional advice on deep tillage practices.

TELEFACT
U.S. FREIGHT CARS CARRYING HEAVIER LOADS
50 TONS
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AVERAGE LOAD 1941 27.7 TONS
AVERAGE LOAD 1943 33.6 TONS

Two pieces of wood, one impregnated with methylolurea and the other untreated, were exposed to the flame of an alcohol burner. The untreated wood soon took flame, while the impregnated merely charred.

At right is shown a demonstration of hardness. Two blocks of wood, one treated, the other untreated, but otherwise exactly the same, were squeezed with a "C" clamp to the same extent. Untreated wood shows a deep depression, while treated wood was scarcely dented.

shoes, clothes and put up buildings," Mr. Preston said, "but also as means of building up wood reserves to create an income balance wheel. We might call it an ever-normal woodbin. Farm forestry has long served such a purpose in European countries."

"Originally there were 913 million acres of forest land in this country, but 60 per cent of this was converted into farms, and farms now occupy fully half of the land area of the United States. The move now is to reconvert much of this cleared land to farm woodlands."

"On farms today, 12,500,000 acres—mostly abandoned fields and gullies—are suitable only for reforestation. Of this large acreage, only 15 per cent is in the south. Sixty per cent is in the central region between Iowa and Missouri on the

west, and New Jersey, Pennsylvania and New York on the east. Three and one-half million acres are considered desirable for shelter belts."

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Artificially Bred Stock Often Better

Plan to Restore European Herds
Postwar Europe's barnyard babies may never get to see their fathers.

Test-tube livestock breeding may, in fact, solve the problem of quickly rebuilding depleted herds and flocks in the war-devastated regions, according to a report issued this week by the American Foundation for Animal Health. This method of livestock breeding which was first developed on a broad scale in Russia, has already been used extensively in this country. To Europe it offers the advantage of avoiding the delays and transportation difficulties which would be involved in shipping breeding animals from this country to the reclaimed battle areas. Instead, male germ cells of various species of farm animals could be collected in this country, flown by fast planes to Europe, and used to fertilize cows, mares, and ewes of the devastated countries.

Experiments by American veterinarians have shown that male germ cells for breeding purposes can be kept active and potent for as long as 130 hours in transit, at a temperature of 40 degrees. For such shipment, the semen is diluted with egg yolk and mineral salts. In this form enough for breeding thousands of farm animals could be flown to Europe in a single plane.

Already Widely Used.
This practice of artificial insemination is already widely used in the United States. In many areas, groups of dairy farmers have banded together and formed cooperative organizations acquiring the use of high quality bulls and the services of trained veterinarians, the latter supervising the breeding animals and doing the inseminating. In this way, hundreds of herds in an area are able to utilize a proven sire of a type which would be beyond the financial reach of the average farmer.

Carefully kept records of various artificial breeding associations show that this "test tube" method may be actually more efficient than natural methods, producing a higher percentage of conceptions. Also, it has been shown that some of the test-tube heifers become better milk producers than their mothers.

Just how practical this application may be to postwar Europe's needs is indicated by the fact that a cow in Argentina was recently bred to a bull in Maryland, by the test-tube method.

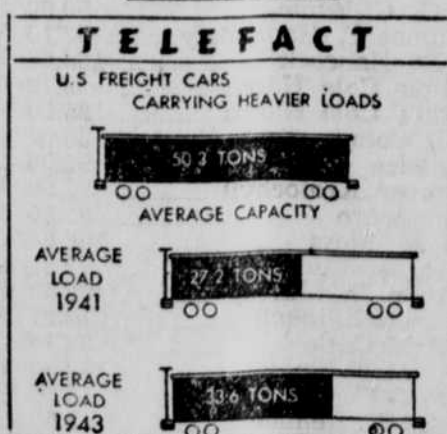


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ASK ME ANOTHER?

A General Quiz

1. Which is the longest and which the shortest coast line of the Atlantic, the Pacific and the Gulf coast lines?
2. What prominent American was born and died in the United States, yet wasn't born in any state nor did he die in any state?
3. A hexagon has six sides, an octagon has eight sides, and a paragon—?
4. What is the difference between "flout" and "flaunt"?
5. In what state was the Comstock lode, the greatest silver and gold mine discovered?
6. Who formulated the principles of the parachute as long ago as 1495?

The Answers

1. Longest, the Atlantic; shortest, the Pacific.
2. Will Rogers was born in Indian Territory and died in Alaska.
3. A paragon is a model of excellence.
4. Flout means to treat contemptuously; flaunt means to display with ostentation.
5. The Comstock lode was discovered in Nevada.
6. Da Vinci.



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