cumulation of dental defects as they found.

According to this plan, in the first year of its operation all defects in permanent teeth of all first-grade children will be taken care of. In the second year any new defects in permanent teeth of these children, by then in the second grade, plus all defects in permanent teeth of all children in the new first grade will be cared for.

"After the operation of the plan for 8 years, all grades of the elementary school population will have received, systematically, treatment for yearly increments of defects," the doctors point out.

All dentists in the community would be expected to take part in the plan. During the first year two-thirds of one per cent. of available professional dental services of the community would be needed and this amount would increase gradually until the eighth year when 10 per cent. of existing professional services would be required to care for that 15 per cent. of the population which attends the elementary schools.

Science News Letter, June 11, 1938

CHEMISTRY

Lignin a Source of Valuable Chemical Raw Materials

Lacquer Solvent, Wood Preservative, Varnish Ingredient, and Clear Resin Made From This "Waste"

CHEMISTRY is at last learning a way to convert lignin, great waste product of the nation's forests, into highly valuable raw materials.

In a report issued jointly by the U. S. Forest Products Laboratory and the University of Wisconsin, a laboratory method of converting lignin into useful materials is described.

They include: a well-known organic solvent, wood alcohol; a new compound, propyl-cyclohexanol, which appears suitable as a lacquer solvent and which has also possibilities as a wood preservative; two compounds having possible use as thickening and toughening agents for varnish; and a clear, glassy resin, extremely adhesive, which has excellent potentialities as a plastic material.

The process of hydrogenation, already used to make petroleum oils out of coal and cooking fats out of vegetable oils, is the one employed in turning lignin, once a waste, into a valuable forest resource.

Atoms of hydrogen are added to the lignin solution by means of heat and pressure. By this severe treatment the dissolved lignin is changed from a dark-brown color to transparency. The different compounds created are removed by distillation.

The encouraging work, still in the experimental stage, is the latest development in the long course of research, seeking valuable uses of lignin, which has been carried on by Drs. E. C. Sherrard and E. E. Harris of the Forest Products Laboratory. The present hydrogenation experiments were performed in cooperation with Dr. Homer Adkins of the University of Wisconsin, who discovered the effectiveness of the copper-chromium oxide, used as a catalyst in the tests.

Lignin comprises from 20 to 30 per cent. of the stems of trees and other woody plants. In the current research it is estimated that more than 70 per cent. of this lignin can be converted into chemical raw materials having industrial possibilities.

The yield of wood alcohol obtained is several times as great, by the new process, as it is from the usual distillation of wood alone.

One ready source of large supplies of lignin is the 1,500,000 tons of the material, annually discarded by factories making pulp for rayon and for the better grades of white paper. Research is now in progress to free these waste liquors of their sulfur content. If this can be done on a commercial scale, such plant wastes will turn into valuable raw materials for chemistry.

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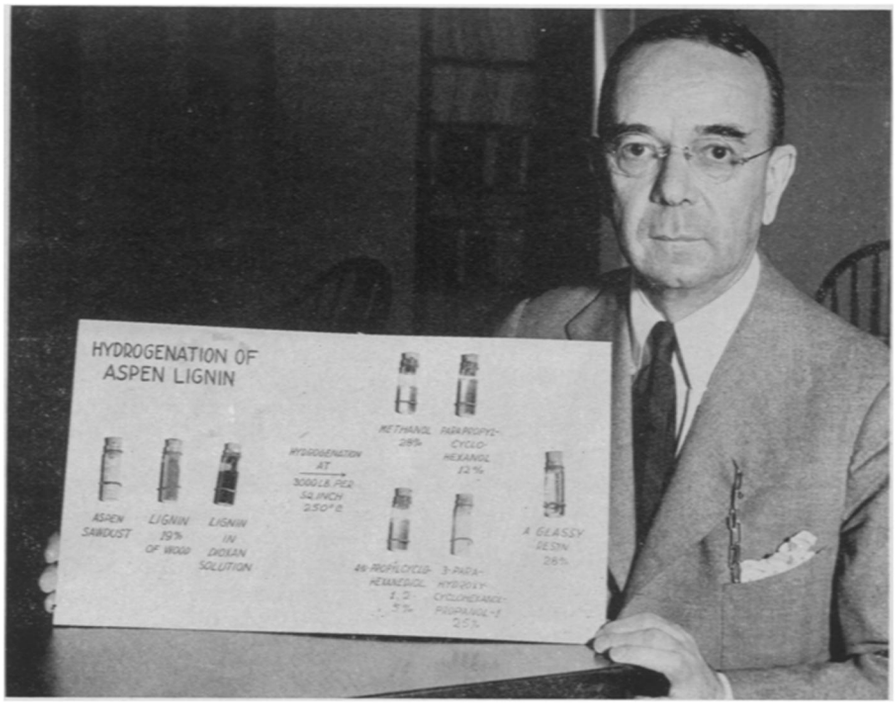
Woodpeckers are rated as valuable conservers of the forest, because they get insects that other birds cannot reach.



FROM LIGNIN

Dr. Carlile P. Winslow, director of the U. S. Forest Products Laboratory, Madison, Wisconsin, holds a chart showing sample bottles of the materials which chemistry now obtains from lignin. Once a major waste product of the nation's forest which had to be laboriously removed in many industrial processes, lignin is now turned into five valuable products including wood alcohol, two thickening and toughening agents for lacquers, a glassy plastic and a wood preservative and lacquer solvent.