

solar energy, pointing out that heat from the sun reaches the earth in the temperate zones at an average rate of approximately four million calories per square yard daily. In the three months of greatest sunshine an acre of land, he estimated, receives directly from the sun an amount of heat equivalent to that which would be produced by the burning of about 250 tons of first-class coal.

"The store of energy in our familiar fuels, while great, is not inexhaustible," he continued, in pointing out the importance of such research.

A primary object of the project will be to determine whether use of solar energy is economically feasible and practical. Solar energy devices already proposed and studied elsewhere will be evaluated with this point of view in mind. The second aspect will consider chiefly the feasibility of developing new conversion equipment using phenomena now under study which hold promise of ultimately being useful in the solution of this problem.

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MEDICINE

Head-Hunter Doctors Set Broken Bones With Chicle

DOCTORS of the Jivaro head-hunting tribe on the Amazon are good bone setters, and use casts of chicle—basis of chewing gum—to hold broken bones in place.

What a family doctor's life is like in this tribe famed mainly for its head hunting, is reported by Matthew W. Stirling, chief of the Bureau of American Ethnology, who ventured successfully into their supposedly dangerous communities.

A Jivaro doctor, called a wishinu, has to study one month before he is considered ready to practice, but there are only six kinds of disease spirits supposed to cause most human troubles. He also has to learn to treat colds, fever and dysentery with specific herbs. His rigid code of medical ethics requires him to answer a sick call at any hour of day or night through trackless jungle. If he fails to cure he may be "sued" for malpractice, which in Jivaro legal machinery means he may lose his head or be required to pay the value of the lost patient's life.

Jivaro doctors are able, honest, and idealistic, Mr. Stirling found. And more often than not they are wealthy.

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PHYSIOLOGY

Dosage of Carotene-in-Oil Eases Eyestrain, Fatigue

EYESTRAIN and fatigue, common complaints among those doing work that requires close attention, have been relieved among color matchers of the Westinghouse Electric and Manufacturing Company by daily doses of carotene-in-oil, a source from which the body manufactures vitamin A, Drs. Ralph C. Wise and O. H. Schettler report. (*Ohio Medical Journal*, June)

Three capsules of carotene-in-oil daily, they declare, by speeding up the regeneration of visual purple, light-sensitive substance in the eye, have improved the efficiency of color-matching inspectors by 75 per cent.

Color inspectors of the company had long complained of severe headaches, burning and smarting eyes. Many of them declared they were unable to read in the evening after work or stated that they actually feared night driving. These conditions have now been changed by use of the new treatment, Dr. Wise, an eye specialist, and Dr. Schettler of the company's medical department, assert.

Basis for giving the carotene-in-oil is the fact that visual purple, the light-sensitive substance in the retina of the eye, is decomposed in the process of seeing and can be regenerated only in the presence of vitamin A. Dosing with car-

otene in effect increases the body's supply of the vitamin so essential to proper seeing. Lack of vitamin A is known to be a cause of night blindness, an eye defect held responsible for a large share of the mounting toll of night automobile accidents.

The possibility of applying this same treatment to other industrial workers required to do eye-fatiguing work is held out by the Ohio doctors.

An interesting by-product of the tests, which Dr. Wise expects to repeat elsewhere, was an appreciable improvement in the health of the workers treated, particularly in cases where fatigue headaches and eye-strain were chronic. Several workers reported gains in weight.

The eye-strain is produced not only by the close application of the eyes required, but also by the unusually bright light in which the work must be done. This light, the doctors note, has a tendency to destroy visual purple and reduce the "light threshold." Measurements conducted with special equipment showed, they state, that the rate of regeneration of visual purple was increased.

The new system is said to be saving the company several thousand dollars a year as well as saving employes' vision.

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DENTISTRY

Grade-School Children Need Much More Dental Service

GRADE-SCHOOL children need six times the amount of dental service they are now getting if the cavities they are going to get in their permanent teeth are to be treated. This appears to be one conclusion of a survey of school children's teeth and dental service made by Drs. Henry Klein, Carroll E. Palmer and John W. Knutson, of the U. S. Public Health Service.

The survey was made of the grade-school children of Hagerstown, Md., a city of about 30,000 population which is "representative of the broad middle range of socio-economic groups in the United States."

About 10,000 temporary and 8,000 permanent teeth in mouths of 4,416 of the city's 4,700 grade school children have cavities that need to be filled. In addition to the total of 33,000 defective untreated tooth surfaces, 7,745 permanent tooth surfaces have been lost by caries or decay.

The magnitude of the caries problem in grade-school children, according to the findings of this survey, is "of such order as to make difficult its immediate practical handling with existing facilities and knowledge," the scientists state in their report. They suggest, however, a plan which may prevent such an ac-

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.

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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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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.

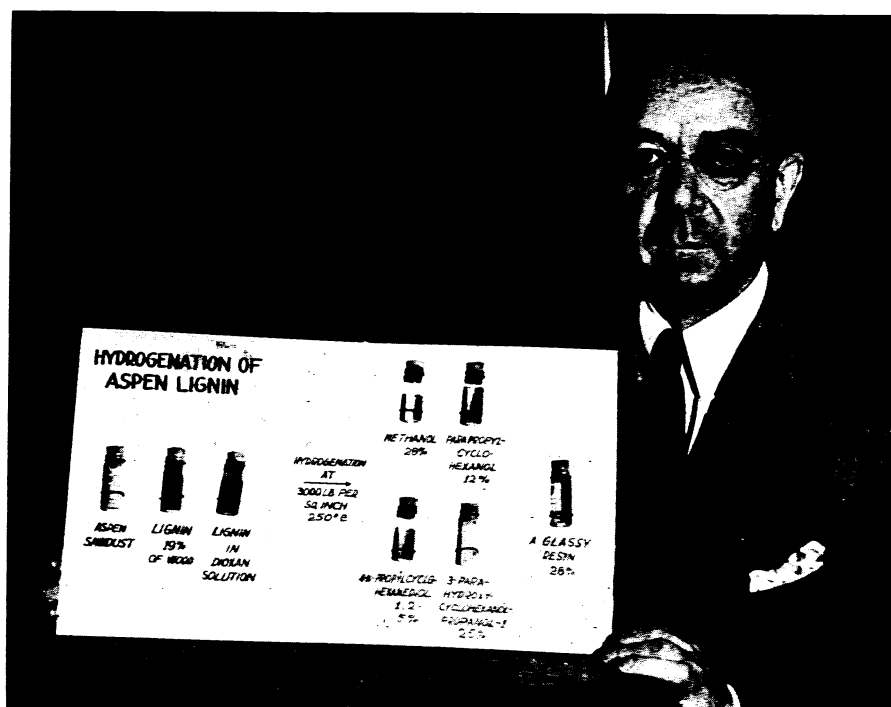
The process of hydrogenation, already used to make petroleum oils out of coal and cooking fats out of vegetable oils, is the one employed in turning lignin, once a waste, into a valuable forest resource.

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

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.