

## Science

**Workers exposed to vinyl chloride exhibit skin disease changes** that accompany scleroderms—a form of arthritis characterized by excess production of collagen. Dr. Hildegard R. Maricq of the Medical University of South Carolina, Charleston, told the annual scientific meeting of the Arthritis Foundation last week in Chicago that the finding may lead to a new model for studying scleroderma. It also may provide an early warning sign of vinyl chloride disease. Of 129 vinyl chloride plant employees studied by Dr. Maricq, 17% had definite skin capillary changes and 22.5% had minimal changes, but only 2% in a control group showed such changes. The vascular changes observed in the workers, Dr. Maricq says, seem to precede the more serious forms of vinyl chloride disease—angiosarcoma of the liver and acroosteolysis, a condition in which the tips of finger bones wear away.

**Density of hydroxyl radical in the stratosphere is not relatively constant** but exhibits significant variations that aren't included in the best models of atmospheric chemistry, according to Dr. Clyde R. Burnett, professor of physics at Florida Atlantic University. Burnett made his measurements from the ground at Fritz Peak, a National Oceanic & Atmospheric Administration laboratory near Boulder, Colo. Previous measurements by others have been from balloons or rockets. Burnett used a spectrometer developed at the University of Wisconsin to measure sodium in the upper atmosphere and adapted it for the hydroxyl radical density measurements.

## Education

**Students who have elective options tend to avoid the natural sciences in favor of the social sciences.** This is one finding in a special study of changing practices in undergraduate education carried out at the University of Michigan's Center for the Study of Higher Education for the Carnegie Council on Policy Studies in Higher Education. The study involved detailed examination of college catalogs and student transcripts. Among reasons given for natural sciences' unpopularity are student perceptions that the natural sciences are difficult, the difficulty of shifting from nonscience to science majors without first satisfying science prerequisites, and loss of the high status of science during the middle and late 1960's.

**A multidisciplinary pulp and paper engineering program** for students majoring in one of the standard engineering disciplines has been started by Georgia Institute of Technology. Departments initially participating in the program include chemical engineering, ceramic engineering, mechanical engineering, textile engineering, and architecture. Plans involve appointment of a technically qualified person with industrial experience as associate professor to head the program, and establishment of a distinguished name professorship with an experienced industry leader to serve as adviser and to provide the necessary liaison between the college and industry.

## Technology

**Viability of coal slurry pipelines has been cast in doubt** in a study conducted by Hudson Institute for Burlington Northern Inc. The study says it would be a surprise if the total initial tariff from mine to boiler that must be borne by a utility were less than 10 mills per ton-mile under currently conceived financing rules for a 25 million ton-per-year, 1000-mile system beginning operations in 1980. On the other hand, the study points out that presumably, through economy of scale, volumes of 15 million to 25 million tons probably could be moved by rail at perhaps less than 6 mills per ton-mile.

**A Center for Energy & Environmental Research will be established in Puerto Rico** under an agreement between ERDA and the University of Puerto Rico. Core of the center will be ERDA's Puerto Rico nuclear center. ERDA will transfer these facilities to the university, provide aid in training and development, and supply more than \$12 million in funding over the next five years. The new center will focus both on problems of Puerto Rico—such as energy control and conservation, and effects of energy use on tropical environments—and on research on new energy sources found in abundance on Puerto Rico, including possibly solar and wind power and ocean thermal gradients.

**Two inexpensive techniques to sample and measure thickness of oil spill films** on water have been devised by the Naval Research Laboratory. One method employs a 5-mil Teflon sheet, pretreated to make it bondable and hydrophilic, to remove oil layers by adsorption. The sheet can be cleaned and re-used. Slower but more accurate in determining precise oil thickness is the use of polyurethane foam disks to sponge floating oil. The oleophilic and hydrophobic disk is weighed before and after contact with the oil and the result converted to film thickness.

**A process using higher alkyl mercaptans ( $C_8$  to  $C_{18}$ ) in froth flotation beneficiation of copper ores** is being offered in the U.S. by Pennwalt, based on use of patents and know-how from Tekplex (Pty.) Ltd. of South Africa. The process, already in commercial use in South Africa, increases copper recovery from certain ores 2 to 5%, using mercaptans as secondary collectors to float mineral particles (such as oxide copper ores) previously lost or that do not float easily. A new application for mercaptans, recovery of copper and possibly other metal values may open a large untapped market for organic sulfur compounds, notes Pennwalt.

**Another new process for producing silicon carbide ceramic material** will be developed through a joint venture between Commercial Technology Inc., Salt Lake City, and Exxon Enterprises, a subsidiary of Exxon Corp. To be called Silag, the venture will bring to commercial scale a patented process for converting rice hulls to submicron silicon carbide whiskers that can be used for making composite materials and metal matrixes for such items as high-temperature engine parts. Rice hulls contain nearly stoichiometric amounts of silicon and carbon needed to form silicon carbide.