

## CHEMISTRY

# Light, Soft Asbestos

Suits for fire fighters and coverings for pipes in homes may be made light as denim coveralls and soft as cotton fabrics.

► ASBESTOS SUITS for fire fighters and the asbestos which covers pipes in our homes may someday be as light as denim coveralls, and soft and pliable as cotton fabrics. Experiments conducted at the Polytechnic Institute of Brooklyn show that some of the fibers of chrysotile, a mineral forming the principal part of asbestos, are coarse and stiff; others thin and flexible.

In studying asbestos, X-ray defraction was used. But instead of having the rays strike the object from above, or from a variety of angles, small angle scattering down to angles corresponding to 500 angstroms is used, Dr. Raymond E. Kirk, head of the chemistry department, explained. The scattering of such small angles gives information not only about the crystal structure but about the particle size. These studies strongly suggest that the chrysotiles are composed of parallel fibrils—hexagonally packed.

Fibers of chrysotile have always been considered uniform in character, since all previously known tests showed no fiber differences. Experiments conducted with the low angle scattering method under Dr. I. Fankuchen, adjunct pro-

fessor of crystal chemistry of the institute, however, showed the fiber diameters to vary according to the mine from which they came.

Chrysotile mined in such countries as Africa, Canada and the United States were studied. Of the mines so far investigated only a limited number provide these thin, flexible fibers which will make possible suits that are just as fire-proof, but much lighter, than present asbestos garments.

X-ray diffraction can be used not only in studying materials used in manufacturing a product, but also in controlling the products during manufacture and in providing information on the finished material where data on the molecular structure is needed. Quartz crystals, used in incredible numbers in wartime radio sets, and titanium dioxide used in leg alloy, need control during manufacture. Alloy steels and textile fibers should be analyzed upon completion.

In England, Dr. Fankuchen worked with Prof. J. D. Bernal of the University of London, who first made use of the technique of low angle scattering in connection with a study of proteins and

virus diseases. Since returning to America a short time ago, Dr. Fankuchen has adapted this technique to the study of minerals and high polymers.

Some industries in the East are considering the use of X-ray diffraction, but do not have trained men in their laboratories. To meet this need, the Polytechnic Institute of Brooklyn is conducting an intensive clinic on "Industrial Applications of X-ray Diffraction" from July 10 to July 21, under the direction of Dr. Fankuchen. Industries in the East have been invited to select laboratory workers to send to the clinic.

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## AERONAUTICS

## Schools on Wheels Keep Flyers Up To Date

► SCHOOLS on wheels, mobile instruction units, are being used by the Army and Navy to keep pilots and ground crews in war theaters up to date on changes made in the planes they are using.

Since it is not practical to bring ground or flight crews back to the United States from Africa, Italy, England, or Australia for re-schooling every time a change is made in the design or construction of the planes they are flying, the Technical Training Commands of the Army and Navy have developed 96 mobile training units on all the standard military aircraft. The units now in operation include P-38, P-47, P-51, A-20, B-17, B-24, B-25, C-54, the new Superfortress B-29, and many others.

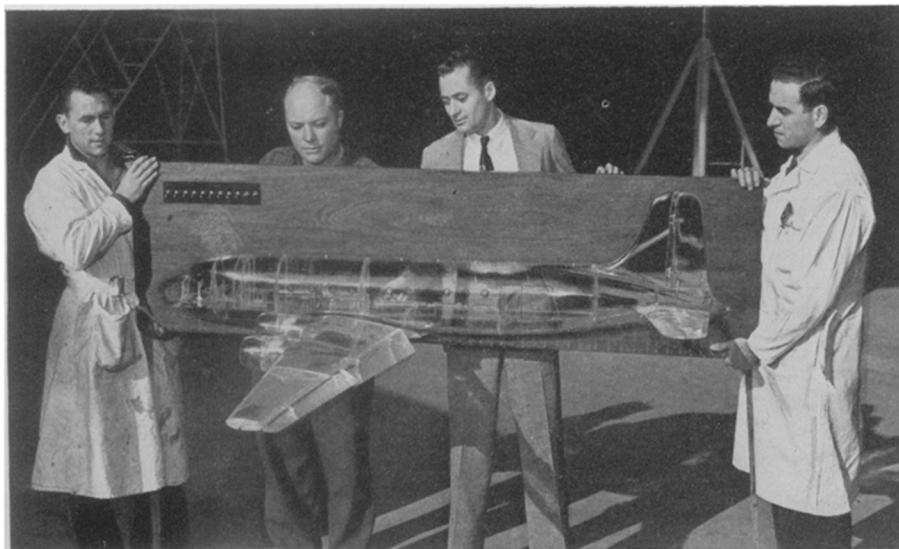
Each training unit is a school within itself. It contains a number of instructional exhibits, covering every mechanical device used on the plane, from the engine to the bombsight. The actual aircraft parts are mounted on special panels which hinge together to form the sides of eight large boxes, for convenient, secure handling.

Each of the units is based on the latest "know-how" in assembling, installing and servicing the equipment and modifications—secret and otherwise.

The school is under the direction of nine men, expertly trained in operation of the engine, hydraulic system, instruments, electrical system, radio, fuel and heating, and other parts of the plane. The course of instruction is flexible, it may last two days or two months, depending on the circumstances.

The equipment is carried by truck trailer or by air.

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**HALF A PLANE**—This transparent model is intended to instruct pilots and ground crews in the latest developments in aircraft. It contains, clearly visible, all the functional systems of a plane in miniature.