manufacturers are finding it difficult under present conditions to obtain enough animals.

The other method combines the administration of anti-canine-distemper serum with living virus. Whichever method is used, authorities warn that immunization must be undertaken only by a veterinarian.

Science News Letter, January 23, 1943

MEDICINE

New Hope for Polio

Mouse-adapted polio virus counteracts infantile paralysis-causing parent substance in monkeys. Research may reveal practical application.

➤ HOPE that a chemical inhibitor for treating infantile paralysis may some day be developed is offered by an editorial in the *Journal of the American Medical Association* (Jan. 16).

This possibility is suggested from research by Drs. C. W. Jungeblut and Murray Sanders, Columbia University bacteriologists. They passed the New Haven strain of polio virus through cotton rats, thus adapting it to white mice. By this time the virus had lost most of its original disease-producing potency in monkeys.

Among their observations was evidence that a strong antagonism existed between the mouse-adapted virus and the parent strain which caused paralysis in monkeys.

When they mixed a few drops of the mouse-adapted virus with the deadly form, it was found that monkeys survived at least a hundred minimum doses of virus that ordinarily would have caused paralysis.

Another series of experiments by the researchers showed that this living vaccine from mice also had value in protecting the monkeys from contracting polio or in reducing the paralytic symptoms. From three to five doses of the mouse-adapted virus were given by injection at daily intervals from one day to two weeks before inoculating the monkeys with simian infantile paralysis. Symptoms were greatly reduced and only 13 out of 26 monkeys developed recognizable paralysis. All 19 monkeys that did not get the treatment developed partial or complete paralysis.

The main problem now, the medical journal comments, is to develop a basic explanation of the observed antagonism between the mouse-adapted virus and its parent. Some believe the action is due to a noninfectious chemical inhibitor formed by the mouse-adapted virus.

Research work by Dr. Jungeblut, Dr. Sanders and associates is continuing. For, as the journal points out, such a basic discovery would perhaps be of major practical interest.

Science News Letter, January 23, 1943

CHEMISTRY

Structure Governs Use

Difference between springy rubber and hard plastic or tough fiber depends upon the way the molecules regiment themselves.

➤ THE DIFFERENCE between a springy rubber-like substance and a hard plastic or a tough fiber, either synthetic or natural, lies in the tendency for the molecules of these substances either to contract or to form crystals, Dr. H. Mark, professor of organic chemistry at the Brooklyn Polytechnic Institute, is telling chapters of Sigma Xi at various universities, speaking as a national lecturer for Sigma Xi.

The more crystallization in its structure the more the substance becomes a typical fiber, such as nylon, silk, cotton or rayon, Dr. Mark explained. If the mutual attraction between the chain-like molecules of a given material is low, then it will show mainly the properties of an elastomer such as rubber, Buna S., Neoprene, Hycar, butyl rubber, etc. This is also true if the molecules do not fit well into a regular three-dimensional lattice structure. In between these extremes, the substance will show the properties of a plastic, such as hard rubber, methacrylate (lucite), vinylite, polystyrene or ethyl cellulose.

Present experimental knowledge shows that all of these substances have about the same fundamental structure, but it is their ability to crystallize that gives them different properties.

Dr. Mark told his scientific audience that all types of what the chemist calls "high polymers," whether they be rubbers, plastics or fibers, have the same high order of polymerization, that is, their molecules are composed of about 2,000 or more atoms.

"Polymerization" is the name that the chemist gives to the process of making big molecules out of little ones. Either by natural processes or by the skill of the chemist's reactions, simpler materials are built up into more complex ones to form our most useful rubbers, plastics and fibers. These are molecules in which the atoms are visualized as being in a long chain.

"During the past 15 years," Dr. Mark said, "a new branch of organic chemistry has been started and gradually developed. This is the chemistry of the high polymers. The natural products belonging to this class of substances, for example, cellulose, starch, proteins, chitin, rubber, etc., have been known for a long time, but it was only recently that successful attempts were made to elucidate their molecular structure and to realize their common fundamental building principle. Synthetic products of resinous character built up from small molecules, such as formaldehyde, ethylene oxide, vinylchloride and styrene, have also been known for some time, but again their molecular structure and their fundamental relationship with the natural high polymers were not known until about 10 or 15 years ago."

Dr. Mark named the dozen investigators who had contributed most to the knowledge of the structure of these substances: Dr. W. T. Astbury, Leeds, England; the late Dr. W. H. Carothers, du Pont chemist whose work led to nylon and Neoprene; Dr. K. Freudenberg, Heidelberg, Germany; Dr. W. N. Haworth, Birmingham, England; Dr. H. Hibbert, Montreal, Canada; Dr. J. W. Hill, du Pont; Dr. P. Karrer, Zurich, Switzerland; Dr. E. O. Kraemer, Newark, Del.; Dr. C. S. Marvel, Urbana, Ill.; Dr. K. H. Meyer, Geneva, Switzerland; Dr. H. Staudinger, Freiburg, Germany; Dr. G. S. Whitby, Akron, Ohio.

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