CHEMISTRY

Giant Egg-Shaped Molecules Seen With a Microscope

Discovery May Make Possible a Really Successful Synthetic Rubber With Molecules 8 Times Present Size

EGG-SHAPED molecules so large that they may be seen with a microscope—the first time any molecule has been seen with such apparatus—have been discovered at Urbana, Ill., in the X-ray laboratory of the University of Illinois.

A molecule is the smallest subdivision of a chemical compound in which its chemical properties are maintained.

Scientists are hailing the new find as the foundation for a really successful synthetic rubber. It is believed present day synthetic rubber-like products have been made erroneously on the basis that rubber molecules each weighed 68,000 times as much as a hydrogen atom. The new super-giants of the molecule world weigh 500,000 times as much as hydrogen atoms; over seven times as large as science's estimate of rubber molecules.

Yet the new giants are just at the limits of the microscope. They are six one-hundred-thousandths of an inch long.

Prof. George L. Clark of the chemistry staff and pioneer in industrial X-ray work made the discovery of the giant molecules. Their presence had been indicated by observing the fashion in which they bent, or diffracted, X-rays but only now have they been isolated for microscopic observation.

Botanists have known for years that the basic structure of cellulose and plant products consisted of little crystalline particles linked endwise. These structures could be seen in a microscope and were made up of the giant molecules.

The reason for failure of science to see the actual molecules before, Prof. Clark states, was that they were embedded in a jelly-like substance which had not previously yielded to any breaking down process.

The value of the new discovery for rubber-making in laboratories lies in the fact that no substance can be man-made until its exact molecular weight is known and used in the manufacture.

From the discoveries of Prof. Clark it appears, therefore, that rubber chemists need to make a rubber molecule nearly eight times as large as those with which they have been working.

Man-made molecules of such enormous size have not yet been produced in the laboratories. Few people even suspected that such large molecules could exist. Prof. Clark's work shows that in plants these giants are possible.

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AERONAUTICS

Hot-Air Balloon "Lifts Itself By the Bootstraps"

BALLOONS that "lift themselves by the bootstraps" may soon join gliders as popular sports air-vehicles in Germany. A Vienna-born aircraftsman, Rudolf Brunner, has revived the almost extinct hot-air balloon by means of a heating apparatus that can be carried aloft in the basket and continue to pour hot air into the bag in exactly regulated volume, making for easy control of its lifting power and eliminating the need for ballast. (*Die Umschau*, Jan. 20).

Hot-air balloons were the first form of aircraft that ever successfully left the ground, carrying human passengers. They were in wide use as spectacles in the late eighteenth and early nineteenth centuries, but with the invention of balloons lifted by hydrogen and other light gases they passed virtually out of the picture, being relegated to small fairs in the rural regions. Their "jumps" were necessarily short, for as soon as the initial supply of warmth in them passed out, they had to come to ground.

Herr Brunner's "bootstrap" invention consists of a simple type of burner which it is said any tinsmith can put together. The fuel is crude oil. A pipe carries the burner up to the bottom opening of the balloon, and the spreading-ring there prevents the fabric from coming within igniting distance of the flame. Valves regulate the flame to any desired height, and thus control the lifting power of the heated air.

The balloons used by Herr Brunner are small, carrying only one person and the heating apparatus. It is not expected that they will have any usefulness outside the field of sport, but since one of them can be operated for about five marks (about $2) per flight-hour, this means of getting aerial thrills may be within the reach of persons of moderate financial status.

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GEOLOGY

Dr. David White, Geologist, Dies During Sleep

DR. David White, noted Washington geologist, died in his sleep during the night of Wednesday, Feb. 6. He had been in ill health for some time, though he had continued to work steadily until a few days before his death.

Dr. White was special geologist of the U. S. Geological Survey, associate of the Smithsonian Institution, and a trustee of Science Service. He had also held offices in the National Academy of Sciences and the National Research Council, and was a research associate of the Carnegie Institution of Washington. He was a specialist in the study of records of life in the most ancient rocks.

Dr. White was born at Palmyra, N. Y., in 1862, and held degrees from Cornell University, the University of Cincinnati, the University of Rochester and Williams College. Dr. White's paleontological interests were practical as well as "pure" science. A substantial sector of his international reputation rested on his knowledge of coal and petroleum geology.

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DR. DAVID WHITE