PHYSICS

New Electron Spectrometer May Identify Molecules

Submicroscopic Objects, "Seen" for First Time With Electron Microscope, Will Now Be Analyzed

SHOOTING an invisible beam of electrons through a tiny, invisible specimen may eventually permit identification of individual molecules.

The first electron spectrometer, an instrument for finding the composition of such small bits of matter, is being completed by Dr. Albert Prebus at Ohio State University. Dr. Prebus, with coworkers, is also noted for having built the first electron microscope to be used in America.

Pictures taken under the electron microscope, like those in the family album, give a physical portrait but seldom reveal the true nature of the individual. Therefore, submicroscopic objects, seen for the first time by using the powerful electron microscope, will now be examined with the spectrometer to determine their composition and properties.

A better chemical understanding of the mysterious viruses is likely. And it should be possible to follow the reactions which occur in the battle between our virus enemies and the antibody defenses of the blood. Disease-producing germs are in for a similar scrutiny.

Just how drugs in turn attack the germs can be investigated by the analyzing beam of electron particles. What makes the sulfa drugs so effective, for example, is one of many such medical controversies.

Rare earth metals are to be used in one of the first research applications of the new device. These rare earths can be recognized even when mixed with other complex materials. Thus they serve as identification tags when attached to other substances. Adventures of these tagged materials in their associations with minute plant and animal organisms can then be followed by using the new spectrometer.

The main advantage of such experiments is that the sample of material can be thousands of times smaller than that required by the best chemical methods. About a hundred thousand such tests can be made from material piled on the head of a pin.

While examining such small particles under the electron microscope, Dr. Prebus got the idea for the spectrometer from a defect in the microscope's operation. This is how it happened.

A beam of electrons is used here instead of light to form the magnified image. As these particles of electricity pass through the specimen, they collide with the chemical elements present. Dr. Prebus found that this causes some of the electrons to lose part of their energy and not focus properly. These "tired" electrons were a nuisance.

But this loss of energy, it was observed, is always the same for a particular substance. On this basis the electron spectrometer was constructed. By measuring the losses of energy after shooting electrons through a specimen, chemical composition can be interpreted.

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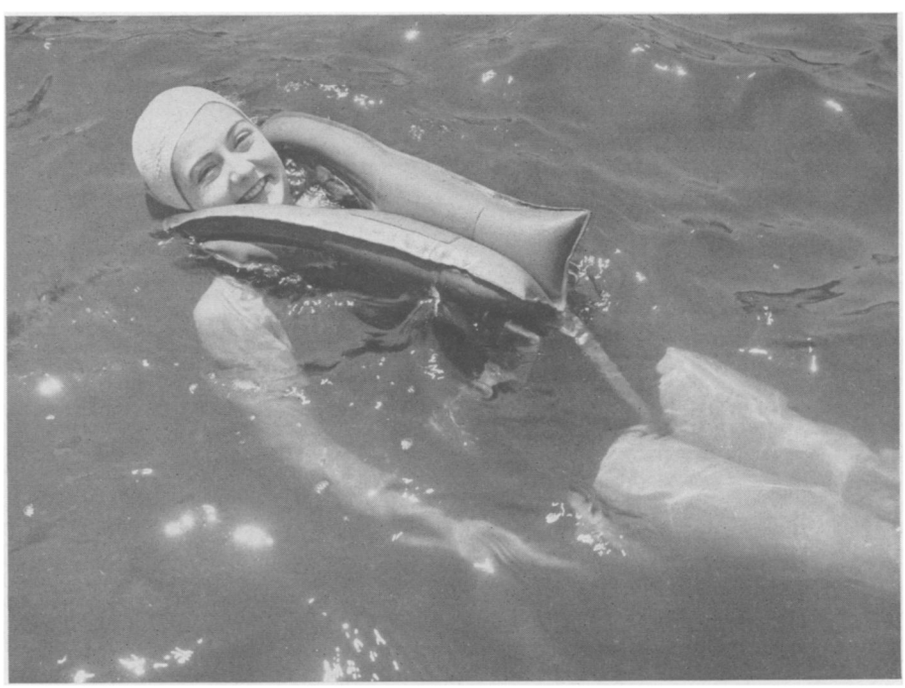
ASTRONOMY

"David" Comet Loses Fight With "Goliath" Jupiter

A COMET with its best days behind it and a story of a David and Goliath battle of the heavens has been unearthed by astronomers at Harvard Observatory, according to a paper on Comet Whipple 1933f presented by Richard N. Thomas at the American Astronomical Society meeting in New Haven. This comet was discovered by Dr. Fred L. Whipple, of Harvard, in 1933; it is an inconspicuous object, but in 1922 and prior years it traveled close to Jupiter, and the tremendous attraction of that planet, the largest in the system, altered its orbit greatly.

Mr. Thomas reported that in 1922 the orbit of this interesting comet was nearly circular, as comets' orbits go, and almost as large as that of Jupiter. But when the comet and Jupiter traveled together for a time the orbit of the comet was



PROTECTION

A life vest for U. S. Army Air Corps flyers is here demonstrated by Elaine Eversole, speed swimmer. Deflated, the vest can be worn without interfering with the movements of the wearer. Pulling a cord at the bottom of the vest punctures a carbon dioxide cartridge which inflates it in less than three seconds. Even if the wearer is unconscious, the vest will hold his face above water. It is manufactured for the Army Air Corps by the Firestone Tire and Rubber Company.