tiplier which operates a facsimile printer.

Only a few days before at the Penn State College meeting of the American Physical Society, Dr. Hillier, R. F. Baker and Zworykin announced another major improvement in electron microscopes. (See following article.)

*Science News Letter, July 11, 1942*

PHYSICS

# Electron Microscope Now Analyzes Molecular Structure

## Adapter Applied to Standard Instrument Converts It To Diffraction Camera; Can Be Used on Same Specimen

**See Front Cover**

THE ELECTRON microscope can now not only make an enormously magnified picture of a minute object but also peer into its insides and determine its molecular structure. You cannot see the atoms but you can find out where they are.

This of course could be done before by means of another instrument, the diffraction camera, using either X-rays or electrons. But now an "adapter" applied to the standard commercial electron microscope, quickly converts it to a diffraction camera, thus dispensing with the second instrument and with a second source of radiation.

Within a few minutes of each other a picture and a diffraction pattern of the same specimen can be made without remounting it, without removing it from the vacuum, and without tampering with it in any other way. In many fields of investigation this is a great advantage.

How it is done was described by Dr. J. Hillier, R. F. Baker and Dr. V. K. Zworykin of the Research Laboratories of the RCA Manufacturing Company, Camden, N. J., at the meeting of the American Physical Society at State College, Pa.

To pass from microscope to diffraction camera, it is only necessary to shift the position of the specimen in the tube, which is done by gadgets on the outside, and to change the lens. The latter is easy. An electron lens is merely a coil of wire in which an electric current is flowing. When the current stops, it ceases to be a lens. Hence, to switch from the projection lens which makes the picture to the lens which produces the diffraction pattern, it is only necessary to switch the current from one to the other.

The instrument is so arranged that diffraction patterns can be made either by transmitted light or (for opaque objects) by reflected light. For the latter the specimen is turned so that the electrons are reflected at a grazing angle. Provision is also made for rotating the specimen in its own plane, which is useful in making diffraction patterns.

The diffraction pattern produced in this way is a set of concentric circles, some sharp, some diffuse. From dimensions and intensities, the arrangement of the atoms in the material can be determined.

The incorporation of the adapter in the standard instrument does not increase its dimensions nor interfere with its functioning as an electron microscope, the scientists said. But it does considerably widen the usefulness of an already widely useful tool, saves time, expense and labor, and makes it possible to investigate materials that change.

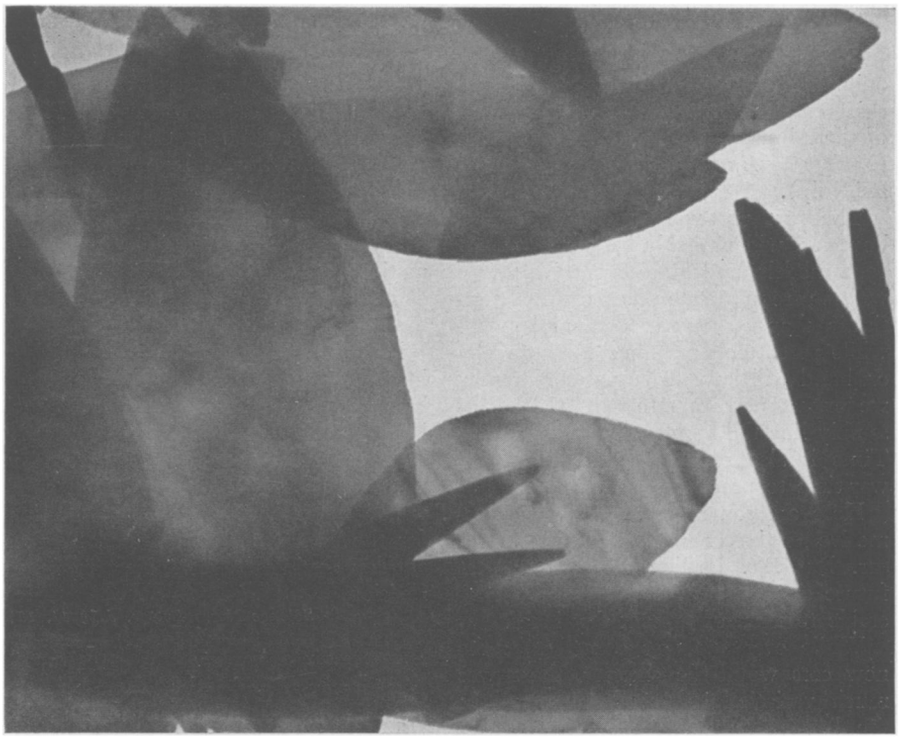
*Science News Letter, July 11, 1942*

MEDICINE—PHYSICS

## Electron Microscope Shows Germ Killers at Work

THE ELECTRON microscope, science's latest weapon for seeing the invisible and peering into the structure of life, now promises to show just what happens to an individual disease germ when it is attacked by a germ-killing agent such as bichloride of mercury.

First studies along this line will be reported by Dr. Stuart Mudd, of the University of Pennsylvania, and Dr. Thomas F. Anderson, of the RCA Manu-



*ELECTRON MICROGRAPH*

***Each of the large dark masses in this picture is a tiny speck of aluminum oxide no larger than the point of a needle. The electron microscope has magnified these specks 40,000 times. When the microscope is changed over to a diffraction camera, the pattern shown in the picture on the front cover of this week's SCIENCE NEWS LETTER is produced by the same substance.***