

CENTRAL INTELLIGENCE AGENCY
INFORMATION REPORT

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1. The Electron Microscope Laboratory in the Research Department at VEB Carl Zeiss, Jena, is under the direction of Dr. Ernst Guyenet. He is assisted by E. Hahn and approximately 16 other scientists and technicians. At the April 1955 meeting of the German Electron Microscope Society in Muenster, both Guyenet and Hahn dealt with their work at Jena. Guyenet and Hahn were also present at the Achema exhibition in Frankfurt/Main during the week of 16-21 May 1955 where they demonstrated the new electrostatic electron microscope, Elmi D, recently developed at Guyenet's laboratory.
2. The Elmi D electrostatic electron microscope is similar in many respects to one developed and placed in production at Jena over a year ago, but has been completely redesigned with many new features. Only six to ten units of the first type were produced. The present microscope is not intended to have an extremely high magnification, but rather a medium magnification with especially clear pictures and ease in operation. Characteristics of this microscope are as follows:

Astigmatism: Corrected to less than 5 mu.

Weight: Microscope - 500 kg.
Power Supply and pumps - 600 kg.
Total weight - 1100 kg.

Number of objectives: Five.

Number of forepumps: Four.

High voltage: Regulated to 50 kV; all high-voltage parts, including the cable, are immersed in oil.

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High-voltage supply frequency: 50 kc.

Photographs: Chamber will take either four 6.5 x 9 cm. plates or normal 35-mm. film. Approximately one day's supply can be de-gassed in the vacuum chamber provided in the housing in back of the microscope.

Objective changing: Approximately 30 seconds.

Magnification with help of normal optical microscope: 5 to 150,000 x.

Vacuum: 2 to 3 x 10⁻⁶ mm.

Diameter of image: 100 mm.

Lense system: 5-stage electrostatic system.

Images: Light or dark field pictures, stereo photographs and diffraction pictures.

Electron optical magnification: In calibrated steps - 2000, 3000, 6000, 8000, 12,000, 20,000 and 30,000 x, with additional steps between 600 and 2000 x.

- 3. Plans now call for two additional electron microscopes to be completed by December 1955 and six more during the spring of 1956. These units will not be constructed in the Electron Microscope Laboratory but in the Development Department which is equipped for this type of small-series production. Even in the development stage, all except the smallest parts had to be constructed in special machine shops associated with the Research Department of Zeiss Jena. In the first tests on the electrostatic optical system, brass lenses were used in place of steel in order to simplify the construction of the parts.

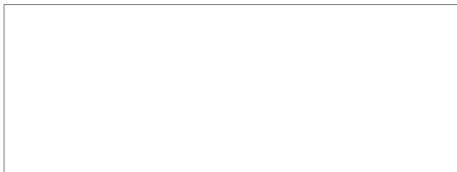
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- 4. Several improvements will be made on the next two units which will be produced for sale. The principal change will be the addition of a fine ray condenser. However, the general appearance of the microscope will not be altered substantially. The high-voltage supply and the vacuum pumps for the microscope are mounted in separate cabinets and can be placed in another room or on another floor, up to approximately 16 meters away from the microscope.

- 5. Hahn was primarily associated with the development of the condenser system and the electrostatic focusing lenses, whereas Guyenot was concerned with the general guidance of the project as a whole. Guyenot was formerly with another laboratory in Zeiss Jena and was transferred to his present position during the past year.

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