ABOUT OUR COVER

SCANNING ELECTRON MICROSCOPY

The cover photograph[1] is a scanning electron microscope image of pollen of *Hibiscus rosa-sinensis* L. clinging to the convoluted anther. The large pollen grains are mature and undoubtedly viable. The small pollen grain at the right is probably aborted pollen which is rather common in species hybrids. Some cellular structure of the anther wall is evident.

Sample preparation consisted of mounting a critical point dried anther on an aluminum stub with television Tube Koat and coating the sample with gold by sputtering from a thin foil.

The image on the cathode ray tube (CRT) is black and white because the secondary electrons emitted from the specimen are collected by the scintillation detector which in turn modulated the CRT by the intensity of electrons emitted from sample.

In order to convert the black and white photograph to color the original negative is printed on green Argenta paper at the size desired. The negative is again printed on yellow Argenta paper at a size slightly larger than the green print. The pollen grains are then superimposed from the yellow print making sure the edge cut is at an angle to prevent the white edge from showing. The grains are then carefully affixed to the green print. The composite is then rephotographed on color film and printed with standard color techniques.

The electron optics laboratory at Michigan State University is a combined teaching, research and service facility. Instruments in the facility are a scanning electron microscope (SEM) (Advanced Metals Research, Model 900) with a 10.0 nm resolution, a transmission electron microscope (TEM) (Philips, Model 300) with a .25 nm resolution and an electron microprobe X-ray analyser (MP) (Applied Research Laboratories, Model EMX-SM).

The Electron Optics Laboratory was established on the concept that there is a broad need for students and faculty to have access to all types of electron optical equipment and at the same time variable levels of knowledge concerning use, operation and interpretation. The teaching component of the facility is geared at three separate levels: 1) the student and faculty member interested in being able to understand the basic operation of the instruments with a need to interpret electron micrographs, 2) those principally interested in utilization of the SEM and MP and corresponding sample preparation techniques, 3) an in depth course including "on hands" use of the TEM, all sample preparation equipment and instrument trouble shooting.

Todays scientist must be able to understand the effect of instrument conditions on the specimen, the depth of penetration of the beam, interpretation of the electron micrograph and some knowledge of the fixation and staining or coating procedures. Electron micrographs regardless of the instrument used can contain artifacts and without some basic knowledge readers cannot critically evaluate the work.

The services and research aspect of the lab are not as clearly separated. Student research must be original research geared to further their education and should not be part of any faculty research. Such research is registered for and a grade given.

Faculty research is scheduled and may be carried out by electron optics laboratory personnel or by faculty or graduate students with demonstrated competancy. This research is scheduled by the half day with sample preparation to be completed upon arrival.

In addition to providing instrument service, the lab personnel also provide sample preparation on request for both students and faculty.

Techniques have been developed in the electron optics laboratory to allow the researcher to observe the same specimen with the stereolight microscope, the standard microscope, the scanning electron microscope and the transmission electron microscope. Such a complimentary approach of instrumentation re-inforces data interpretation and therefore increases confidence in results and conclusions.

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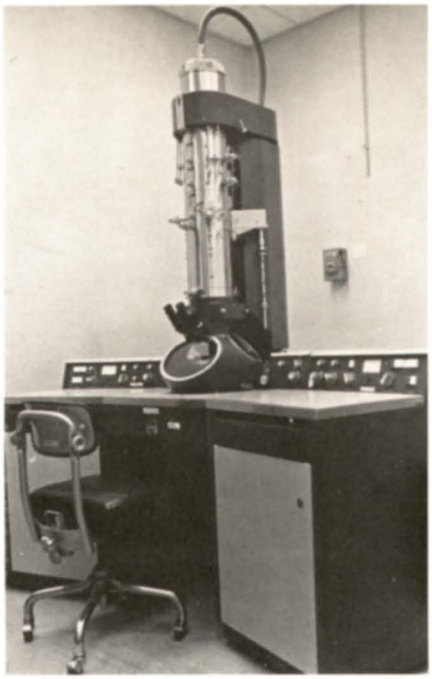
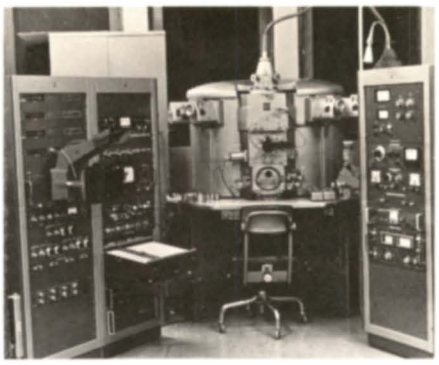
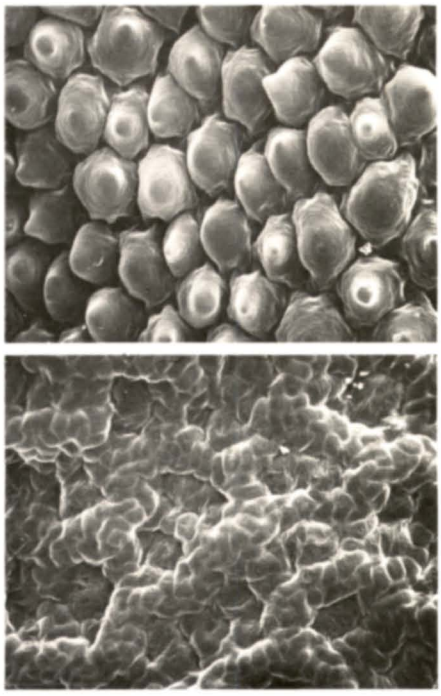


Transmission Electron Microscope, Philips Electronics Model 300.

Scanning Electron Microscope, Advanced Metals Research Model 900 High Resolution.



Electron Microprobe X-ray Analyzer, Applied Research Laboratories Model EMX-SM.



Scanning electron microscope view of upper (top) and lower surface (bottom) of hibiscus petal (× 250).

[1]Cover photograph by Mr. Vivion Shull and Mr. Art Ackerson.