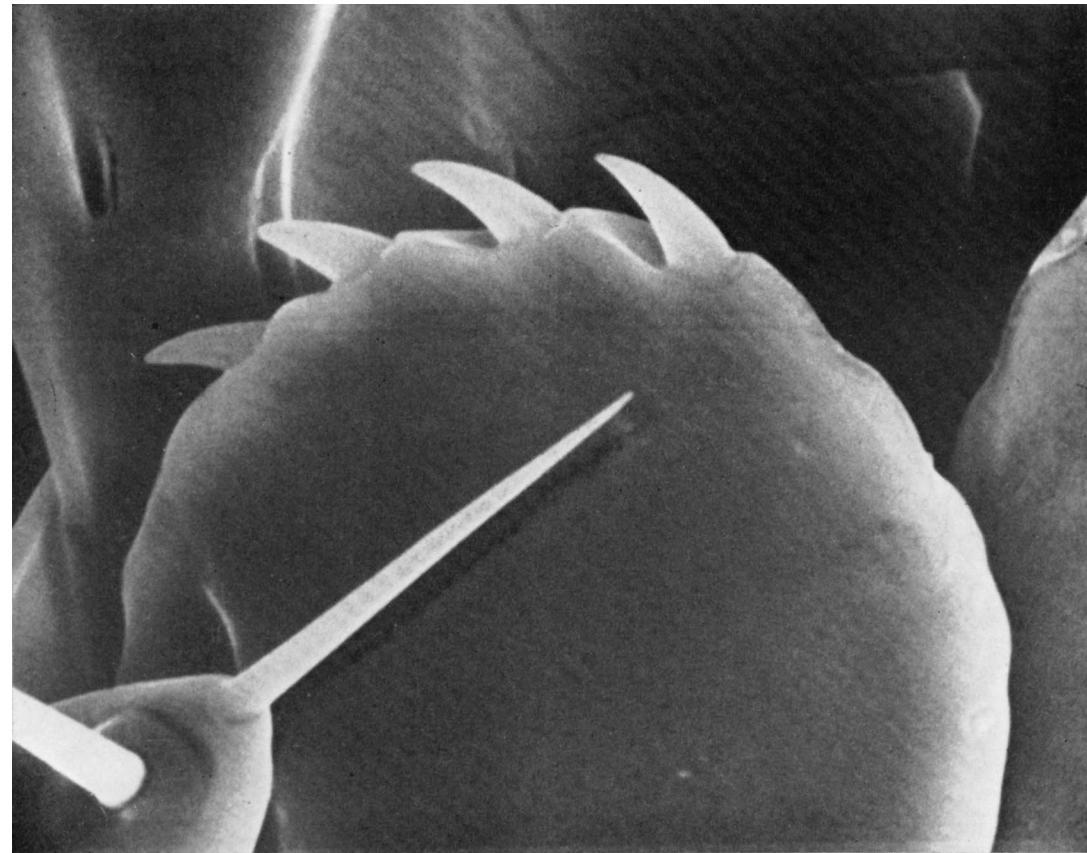


*the*

E. F. LEGNER

M. KOGAN

Electronphotomicrographs of male genitalia of a native parasite of houseflies in California, *Muscidifurax* nov. sp. Kogan and Legner: above (and cover), digitus, base of the aedeagus and sensorial structures at the top of parameres (760 $\times$ ); below, further enlargement of the upper half of the right digitus (2300 $\times$ ).



# SCANNING ELECTRON MICROSCOPE

## *offers new techniques for diagramming diagnostic characters on insects*

---

The remarkable high resolution, and three-dimensional clarity of the new scanning electron microscopes are giving researchers their first accurate view of many minute insect parts—an advance comparable with the change from a magnifying glass to a conventional microscope.

---

**T**HE SCANNING ELECTRON MICROSCOPE, developed recently by British and Japanese firms, is an extremely useful tool available to entomologists for the detailed diagramming of diagnostic characters on insects. Whereas in the past, long hours of careful artistic labor were required to accurately represent parts of insects that could be used in identification, the scanning electron microscope now enables a quick, economical and more accurate representation.

### **Two features**

Two features of the scanning electron microscope that make it superior to a conventional light microscope are (1) its higher resolution and (2) its three-dimensional clarity. Neither of these features can be achieved simultaneously by other methods of microscopy.

The rigid exoskeleton of insects containing diagnostic characters is especially suitable to electron microscopy because a specimen usually retains its exact shape

in the vacuum in which it is placed. In some cases, beetles with extremely hard exoskeletons can be viewed alive for short periods of time.

### **Specimens**

Portions of a specimen to view are usually excised from the gross specimen. These are affixed to aluminum foil by means of Silver Print glue. The foil is attached to a small metal disc. The disc with attached specimens may then be either viewed in the vacuum chamber of the microscope, or it may first be coated with a very thin layer (50 Angstroms) of gold that serves as a shield against the absorption of electrons. This process requires about 15 minutes. Such absorption is undesirable as it causes unwanted reflections on the image.

The maximum accurate resolution of current scanning electron microscope models is about 240 Angstroms, or much greater than is necessary for most diagnostic work. A permanently installed polaroid camera makes possible a print

of any image visible on the fluorescent screen of the microscope. A negative may be printed simultaneously, and this can be further enlarged or reduced as needed.

The photos show scanning electron-photomicrographs of the male genitalia of *Muscidiifurax nov. sp.* Kogan and Legner, a native parasite of houseflies in California. The fine details in these photographs give, at a glance, an accurate representation of key characters used to separate this species from other closely related ones. When familiar with these characters viewed from the photographs, it is then fairly simple to seek them out on actual specimens using a conventional light microscope.

---

*E. F. Legner is Associate Entomologist, Division of Biological Control, University of California, Riverside; M. Kogan is Associate Entomologist, Illinois Natural History Survey, University of Illinois, Urbana.*