

BIOLOGY

# Operate on Tiny Insect in World's Most Minute Surgery

**Creature Only Sixth of an Inch Long Is Worked on Under Microscope With Glass Needles for Knives**

**S**URGICAL operations of incredible delicacy are used for the transplantation of eyes, sex glands, legs, wings, and other organs of tiny insects the size of ordinary gnats, by two young scientists, Drs. Boris Ephrussi and G. W. Beadle. Dr. Ephrussi is a Frenchman, Dr. Beadle an American. The work was begun in Paris, at the Institute of Physico-Chemical Biology, and has been continued at the William G. Kerckhoff Laboratories of the Biological Sciences at the California Institute of Technology. The insects operated on are the favorite experimental animals of geneticists, the handy little fruit-flies known more learnedly as *Drosophila*. They are subjected to the transplanting technique while still infants, in the larval or grub stage.

Although even the largest of these larvae are only a sixth of an inch long and a twenty-fifth of an inch in diameter, both scientists work at the same specimen at the same time.

The operating table is a small glass laboratory dish, and the two biologists work with hollow glass needles, drawn out to hair-line fineness. Each man watches through a double-barreled microscope. With the needles they pluck up the rudimentary "buds" of organs which have been dissected out of one larva, and inject them into the body of another.

The "host" larvae, with their added transplanted organs, are then placed in an incubator and kept at a temperature of 77 degrees Fahrenheit for four or five days, during which time they transform themselves first into pupae and then emerge as full-grown fruit-flies.

## Not Useful

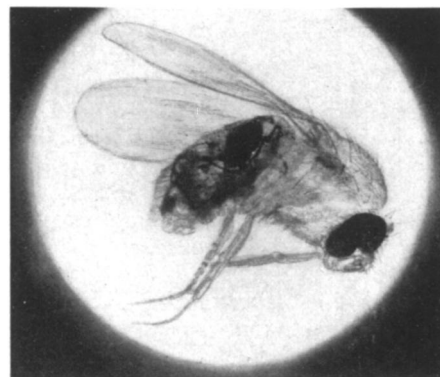
Some of the transplanted organs, of course, are never of any use to the insect that has acquired them. An eye grafted into the abdomen of a fruit-fly becomes a perfect eye, but because it lacks the proper nerve connections does not help its unconscious possessor to see.

On the other hand, transplanted ovaries often successfully make connection with a female insect's egg-laying apparatus, and these then function quite as well as the owner's original pair. Drs.

Ephrussi and Beadle have even transplanted the ovaries of one fruit-fly species into a female of another species, mated the female with a male of her own species, and thus produced hybrid offspring, the actual, biological mother of which was dead several days before her eggs were fertilized and laid.

## Important Purpose

These experiments have a purpose decidedly more serious than just showing that so difficult a biological stunt can be carried through successfully. *Drosophila* has been the most important organism for demonstration of the basic principles of heredity ever since Dr. Thomas Hunt Morgan, now director of the biological laboratories at the California Institute of Technology, carried out the pioneer researches in this particular field many years ago. But certain tissue transplantation work, of value in studying these principles, has hitherto been possible only with larger but less understood animals, like large insects, fishes, and frogs. It is for this reason that genetic-



## A PATIENT

*This is how one of the tiny patients looks under the microscope. It is a matured insect having an extra eye transplanted onto the back of the body.*

ists and biologists generally have taken a particularly keen interest in the work of Drs. Ephrussi and Beadle.

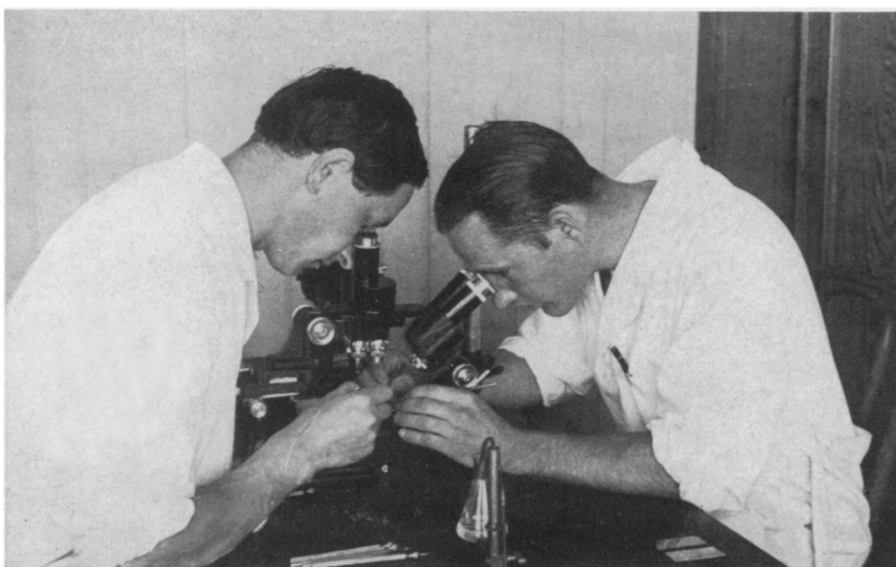
*Science News Letter, October 31, 1936*

BACTERIOLOGY

## Germ Killer Makes Some Germs More Dangerous

**B**ACTERIOPHAGE, an ultramicroscopic bacteria killer, can change the germs of typhoid fever so that they will do some of the things that make those of scarlet fever and erysipelas so dangerous, Dr. Jeanette D. Taranik of Stanford University has discovered. (*Proc. Soc. Experimental Biology and Medicine*, June.)

One of the most dreaded and dan-



## DELICATE

*Using hair-fine glass needles for instruments, and observing their patient through microscopes, Drs. Boris Ephrussi (left) and G. W. Beadle are operating together on the larva of a gnat-sized fruit-fly.*