A living "library" on heredity of the vinegar fly. This specially constructed constant temperature room houses the largest collection in the world of hereditary variations in Drosophila melongaster. Each bottle contains a population of several hundred flies which breed true for some hereditary abnormality. These range from strains of wingless or eyeless flies to those having differences which can be seen only under the microscope.

DROSOPHILA

By ALFRED H. STURTEVANT

WHEN DR. MORGAN came to the California Institute of Technology in 1928 he brought with him the work on the Genetics of **Drosophila** that had been going on in his laboratory at Columbia University since 1910. This work was supported in part by a grant from the Carnegie Institution of Washington from 1915 through 1946, and this grant at one time supported two full-time investigators (C. B. Bridges and J. Schultz) at the Institute.

The collection of living material of this small fly at the Institute is the basic one in the world, and strains from it are constantly being sent to research laboratories in this country and abroad. Two full-time staff members (A. H. Sturtevant and E. B. Lewis) are devoting their energies to the study of this material, and others of the present staff (G. W. Beadle, E. G. Anderson, S. Emerson) have studied it and published on it in the past.

Drosophila is a small fly, about 2½ mm long, that is to be found about fermenting fruit. The properties that first recommended it to students of heredity are that large numbers may be reared in a short time at little expense and in a small space. A single pair will produce hundreds of offspring in two weeks' time, in a single half-pint bottle, on a medium that consists of corn meal and molasses (often slightly stiffened with agar), seeded with yeast. When one compares this fly with laboratory rodents (with their relatively small numbers of offspring per pair, and the greater expense and space required per individual), or with most higher plants (that have one or occasionally two generations per year), it becomes understandable that most of the framework of modern Theoretical Genetics rests on work done with **Drosophila.**

We are sometimes asked if the material is still worth working with. After 35 years of intensive study by many investigators, hasn't the law of diminishing returns set in? Isn't it now more worthwhile

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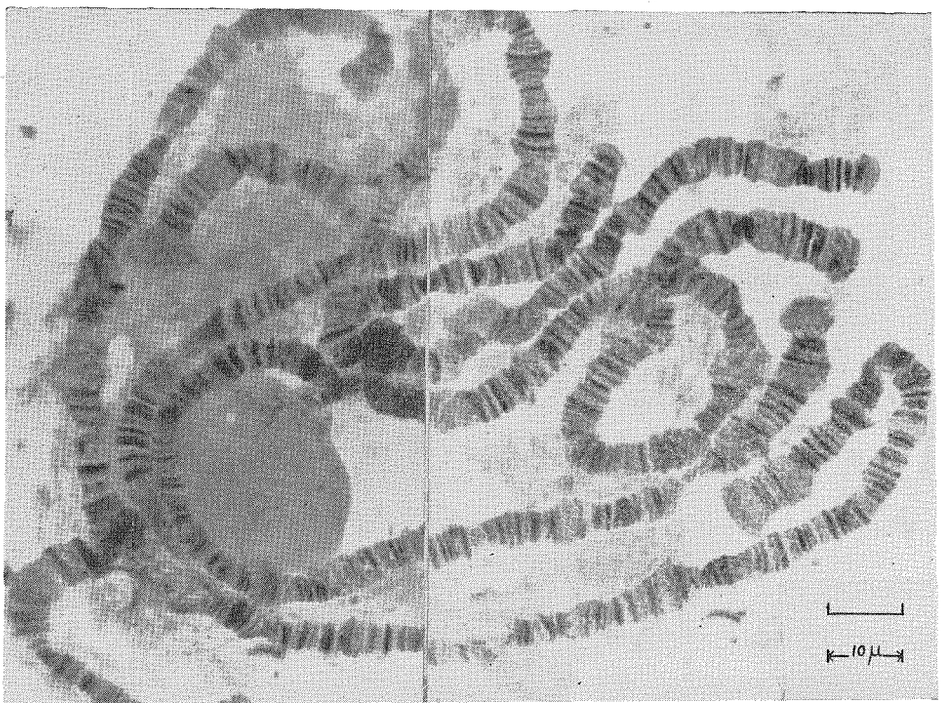

The giant chromosomes of the salivary glands of Drosophila robusta — a species of vinegar fly that has been used in the study of heredity and evolution. Individual chromosomes can be seen as long ribbon-like bodies, which have a highly characteristic pattern of cross bands along their length. It is thought that these cross bands, which number in the thousands, may correspond to the genes — the ultimate units of life. Research is in progress at the California Institute to learn more about the genes through a study of these chromosomes. (The scale of the photograph is shown in microns, one micron being equal to about 1/25,400 in.)

FELLOWSHIPS IN BIOLOGY AT THE INSTITUTE

NEVER BEFORE have the opportunities for fellowship aid in higher education been so numerous. This is as it should be, for never has the need been so great. Except for certain special fields such as medicine, almost no men were given an opportunity for advanced training during the five-year period of the war. We are not only left with a large deficit in terms of normal manpower requirements, but because of the tremendous post-war growth of colleges, universities, and industrial laboratories, the need has increased far beyond that of pre-war years.

Biology is no exception—the need for men with post-A.B. and post-Ph.D. training in this field is great and the opportunities for obtaining this training are many.

Men interested in obtaining advanced training in modern Biology at the Institute will find numerous possibilities for financial assistance if this is needed. The Institute itself administers a number of Graduate Fellowships for which Biology majors are eligible. In addition, a number of Graduate Assistantships are ordinarily available. Recipients of such appointments are expected to register and carry on graduate work as well as to assist in instruction or research. Graduate Assistants in Biology for 1947-48 who assist to the extent of approximately 12 hours per week may, on the basis of scholarly achievement and promise, receive a tax-free tuition grant of $500 and in addition a stipend, subject to normal taxation, of $875 for the academic year.

From the time of its establishment in 1928 the Division of Biology of the Institute has had on its staff many post-doctoral fellows engaged in extending our knowledge of the living world. Some thirteen Fellows of the Rockefeller Foundation have carried on research in the William G. Kerckhoff Laboratories of the Biological Sciences of the Institute. These outstanding biologists of many countries include: Hans G. Bauer, D. G. Catcheside, C. D. Darlington, Max Delbrück, Boris Ephrussi, G. H. M. Gottschewski, H. M. Kalckar, G. Karpechenko, P. C. Koller, K. Linderstrom-Lang, K. Mather, Curt Stern, and M. Westergaard.

Professor A. C. Giese of Stanford University is now a Guggenheim Fellow in Biology at the Institute.

Sixteen National Research Council Fellows in the Natural and Medical Sciences have carried on work in Biology at the Institute. They are: G. W. Beadle, J. B. Buck, C. R. Burnham, A. E. Clarke, B. P. Kaufmann, W. E. Lammerts, Barbara McClintock, Eileen Erlanson MacFarlane, J. R. Raper, J. I. Shafer, Jr., A. M. Srb, M. P. Starr, R. D. Stichler, R. P. Wagner, A. H. Whiteley and M. Whittinghill.

Dr. E. L. R. Stokstad, now with the Lederle Laboratories, worked at the Institute as a Lalor Fellow.

The Institute administers a number of post-doctoral research fellowships. At present there are four Senior Research Fellows in Biology: J. W. Dubnoff, G. L. Keighley, H. K. Mitchell, and S. G. Wildman. There are two Nutrition Foundation Fellows: Marguerite Fling and B. O. Phinney. The Eli Lilly Company has made available to the Institute funds for a post-doctoral fellowship in Biology. This is currently held by D. L. Harris.

In 1945 the Human Betterment Foundation, founded by E. S. Gosney, was dissolved and its assets given to the Institute for the establishment of the "Gosney Research Fund, the income from which will be devoted **in perpetuity** to the promotion of research into the biological bases of human qualities, and for making known the results of such research for the public interest." Currently the income from the Gosney Fund is used to support post-doctoral research fellows in Biology. At present, Ray D. Owen, Werner Maas and Herschel K. Roman, are Gosney Fellows.

From its regular budget the Biology Division supports a number of post-doctoral fellows; at present there are ten such Research Fellows in the several branches of Biology represented at the Institute.

Inquiries concerning undergraduate fellowships and scholarships in Biology at the Institute should be addressed to the Registrar's Office. Graduate Fellowships and Assistantships are administered through the Office of the Dean of Graduate Studies, while information regarding post-doctoral fellowships can be had from the Chairman of the Division of Biology.

G. W. B.

Drosophila

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to study other material? There are several reasons why the prospects for profitable work with **Drosophila** are still good. One such reason is that the large body of knowledge now available — incomparably more than that concerning any other organism— has made it possible to develop new techniques. Another point is that the chromosomes, which are the bearers of the genes (**i.e.,** the hereditary units), show an unusual amount of structural detail in Drosophila. This special property, shared by most of the flies, was wholly unknown when the material was selected for study; but in the salivary-gland cells the chromosome structure can be analyzed in a detailed fashion not approached in any organism outside of this one order of insects. This property makes it possible to attack a series of problems for which no other material is available. The problems that can be studied because of these two circumstances are fundamental and general ones, not merely special things pertaining to **Drosophila** alone.

It is clear that the genetic properties of higher animals and plants are very similar—the same general principles apply to all of them. Accordingly, the study of **Drosophila**, which lends itself easily to laboratory work in beginning classes and in advanced research, is useful as a basis for work in Applied Genetics as well as on the theoretical side. In Applied Genetics there is a demand for well-trained men in agricultural colleges and experiment stations, and there is a growing realization of the need for such men in the field of human heredity—a need coming to be recognized by the medical schools.