

scope in place of a light microscope. The discussion of reflexion X-ray microscopy is, however, on the whole discouraging.

The papers are somewhat uneven in quality, as might be expected in the unabridged presentation of articles by a large number of authors but, on the whole, the book reads remarkably smoothly and the editors are to be complimented on a compilation which welds the diverse contributions into a coherent whole. The book well repays close study by all workers, particularly biologists, interested in future developments in microscopy.

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MODERN CYTOLOGY

International Review of Cytology, Vol. 6

Edited by G. H. Bourne and Prof. J. F. Danielli. Pp. x+566. (New York: Academic Press, Inc.; London: Academic Books, Ltd., 1957.) 12 dollars.

THIS volume contains twelve essays in various fields of cytology, the whole forming a very valuable contribution to knowledge. In some cases the subjects dealt with have advanced so rapidly since the manuscripts were received that their authors could have wished to have been able to add to their conclusions. The antigens of *Paramecia* were first studied so far back as 1905 by Rössle, who showed that rabbits immunized against these Protozoa developed antibodies capable of paralyzing them. Sonneborn's discovery of the mating type system of *Paramecium aurelia* made possible further work on cellular processes in general. G. H. Beale of the Department of Animal Genetics, Edinburgh, now discusses the antigen system of *Paramecium*. Beale believes that the hypothesis of autonomous cytoplasmic states, and the hypothesis of variable gene activity, contain possible explanations of most, but not of all, of the known facts.

Sajiro Makino of Hokkaido University, Japan, writes about those remarkable ascites tumours of rats, which can be transferred from animal to animal by injecting a small amount of tumour ascites into the peritoneal cavity with a sharp pipette. Makino's work shows that the most frequently occurring tumour cells possess characteristic chromosome number modes, along with particular patterns, and form a stem-cell lineage, the members of which serve as the primary progenitors. Makino mentions tumours with distinct chromosome numbers—39, 66, 84, 91, etc.—which is a remarkable contribution to the study of cancer.

Arthur W. Pollister and Priscilla F. Pollister write on the structure of the Golgi apparatus. They state that Jan Hirschler originated the idea that the parts of the Golgi apparatus are formed of a thin lamella, or membrane. While we are all for bringing the work of Hirschler before the eyes of the impatient young men who have an electron microscope, we certainly do not consider that Hirschler knew that what he believed to be the lamelliform Golgi membrane was made up of a pile of separate lamellae or saccules usually of fairly definite number. That the blackened "nebenkern batonette" of molluscs is some kind of a multiple structure was first pointed out by Beams *et al.* What also seems important is that Hirschler in 1932, in the *Comptes rendus de la Société de biologie* (109, 1157), first described the *granulated ergastoplasm* in the spermatid of *Macrothylacia rubi*. Hirschler used material fixed in modified Hermann's fluid, then post-osmicated.

From Palermo comes an interesting article by A. Monroy on the fertilization and activation of the egg, and from Berkeley, California, by Robley Williams, a very full review in the role of the electron microscope in virus research. He writes, "We may hope for techniques that will allow us to put our finger on an image of a tiny particle, and say with some confidence that—this is a *virus* particle".

Arthur J. Hale of the University of Glasgow has fifty pages in the histochemistry of polysaccharides. Those who wish to read an authoritative discussion, for example, on the relationship between metachromasia, periodic acid-Schiff staining and polymerization, will find it here. J. Gross of the State University of New York has attempted to relate follicular structure of the thyroid gland to colloid turnover and iodine metabolism. He correlates our knowledge of the nature and function of the parafollicular cells.

Elio Borghese of the University of Cagliari, Italy, has provided a most useful article on the application of histochemical methods to embryonic tissues. One of the most remarkable contributions in this field was the discovery by Chiguoino in 1953 that the primordial genital cells could be recognized in the mouse embryo on the eighth day of gestation by their high alkaline phosphatase rate. This article is recommended for senior students of the comparative physiology of reproduction. R. J. O'Connor of the Westminster Medical School, London, has a speculative review of the information available about the metabolism of the early embryos of the amphibians, the chick, and the sea-urchin. His contribution can be read in conjunction with that of Borghese.

G. Siebert and R. M. S. Smellie of Johannes Gutenberg University, Mainz, and the University of Glasgow, respectively, have contributed an account of the biochemistry of isolated cell nuclei. Conveniently, the next essay by George H. Hogeboom, Edward L. Kuff and Walter C. Schneider is on the cytochemistry of tissue homogenates. These articles are on subjects which are advancing swiftly. George H. Hogeboom died on July 6, 1956, a great loss to his colleagues at Bethesda, and to this difficult and promising field of modern cytology.

The final article by Freda Bowyer of King's College, London, on the kinetics of the penetration of non-electrolytes into the mammalian erythrocyte, is an abstruse and masterly treatment of the problem of red cell transfer. At present no one has devised a decisive experiment which would eliminate any of the three postulated mechanisms—carrier, enzyme, or pore.

J. BRONTÉ GATENBY

AN APPROACH TO ORGANIC CHEMISTRY

A Modern Approach to Organic Chemistry

By Prof. J. Packer and J. Vaughan. Pp. x+973. (Oxford: Clarendon Press; London: Oxford University Press, 1958.) 84s. net.

THE teaching of a progressive science has been likened to "The Hunting of the Snark" in that the objective is indefinite, changing with time as major research achievements have to be incorporated within limited curricula, and dependent more on the enthusiasm than on the erudition of the teacher. However, a comprehensive text-book should provide a balanced guide to both teachers and students,