

standards of deductive rigor that appeal to most phage workers. However, one might hope that in subsequent editions of this book Drake will bring his talent for crisp analysis and clear exposition to the difficult problems of mutagenesis and its control in eucaryotes.

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Blood Cell Formation

Regulation of Hematopoiesis. ALBERT S. GORDON, Ed. Appleton-Century-Crofts, New York, 1970. Vol. 1, Red Cell Production, xx pp. + pp. 1-766, illus., + index. \$44. Vol. 2, White Cell and Platelet Production, xx pp. + pp. 767-1658, illus. \$46. The set, \$78.50.

These two volumes provide a comprehensive account of current views of hematopoiesis. The chapters vary considerably; some are excellent critical reviews, some are primarily reports emphasizing the authors' own work and views, a few are simply research papers, and a few are so brief that they are of little value. Even in these, the consultation of the literature cited would give pertinent up-to-date information. The references for the various chapters are uniform and complete. The physiology, morphology, chemistry, and clinical findings relevant to hematology are well correlated, and a concerted effort has been made to emphasize the subject as a general biological problem.

The range of hematological problems discussed is wide, and although the emphasis is on mammalian hematopoiesis, a brief discussion of the relatively neglected field of hematopoiesis in non-mammalian vertebrates, as well as an excellent review of insect hematopoiesis, is included.

Several chapters are devoted to the stem cell problem, using primarily data accumulated during the last few years by the spleen colony technique and the growth of bone marrow cells in soft agar. These papers, as well as the more theoretical papers by Hirschfeld and Hodgson, should be stimulating to all investigators interested in the current status of this fundamental hematological problem. The field is in such a state of flux, however, that some of the conclusions may warrant modification in the future. The full potential of these relatively simple yet highly reproducible techniques is only beginning to

be realized and their use, together with already available mouse strains having gene mutations affecting specific stages of hematopoiesis (discussed in a chapter by Russell), will give greater insight into the processes regulating hematopoiesis, possibly at the molecular level.

A number of excellent chapters are devoted to the many problems of normal, fetal, and abnormal erythropoiesis. An excellent critique of the *in vivo* assay of erythropoietin using the plethoric mouse is provided. A similar evaluation of the *in vitro* assay of the hormone, frequently used in studies of mechanism of action of erythropoietin, would be of value. Some attention is given to erythropoietin physiology, with perhaps too much emphasis on the role of the renal erythropoietic factor in the genesis of erythropoietin. These chapters, read in conjunction with the recent book by Krantz and Jacobson (*Erythropoietin and the Regulation of Erythropoiesis*, University of Chicago Press, 1970), provide a balanced account of current knowledge of the erythroid system.

The second volume contains 25 chapters on the normal and abnormal morphology, physiology, chemistry, and kinetics of proliferation of the granulocytes, lymphocytes, monocytes, macrophages, and platelets. The overall coverage is as impressive as in the previous volume, and is well balanced.

Excellent chapters on the fine structure of blood cells are included. The chapter by Wetzel on granulocyte fine structure and his discussion of the technical and interpretative problems of electron microscopy should be read by all hematologists. Regrettably, many of the fine electron micrographs and photomicrographs have suffered a loss of detail during reproduction.

Any hematologist reading these volumes could point out topics that have not been covered, but certainly most of those that have been covered are presented comprehensively. A more thorough indexing of the work would have greatly increased its value.

The price of this work precludes individual purchase, but the volumes should be available in all laboratories interested in hematological problems. Biologists interested in differentiation and cellular interactions should also find this book of interest, since the hematopoietic system provides an excellent model for such studies.

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Chemistry and Entomology

Chemicals Controlling Insect Behavior. MORTON BEROZA, Ed. Academic Press, New York, 1970. xiv, 170 pp., illus. \$10.

Control of Insect Behavior by Natural Products. DAVID L. WOOD, ROBERT M. SILVERSTEIN, and MINORU NAKAJIMA, Eds. Academic Press, New York, 1970. x, 346 pp., illus. \$11.

These two volumes, containing contributions from 38 authors, including 15 from Japan, are largely complementary. Together they probably constitute the most complete and up-to-date reviews available of the various aspects of chemical control of insect behavior by pheromones and substances produced by host plants. As such they will be invaluable background reading and sources of reference for all those who are interested in the isolation, identification, synthesis, biological function, and possible practical use of such naturally occurring organic compounds.

It was an excellent idea for biologists and chemists who are currently working on these problems to consider together plant attractants and the various types of pheromones of both solitary and social insects, and to discuss many of the chemical, physiological, and ethological methods of studying them. The results are very rewarding.

The difficulties of the biologist in devising quick and reliable laboratory bioassay techniques that bear some relationships to natural field conditions are recognized, as are the extremely difficult problems of the chemist, even with the most sophisticated equipment, in isolating and identifying minute traces of biologically potent, and sometimes fugitive, compounds. These problems are well illustrated by the fact that even though more of the so-called "alarm" pheromones, which are not only present in relatively large amounts but are also fairly easily assayed biologically, have been identified than pheromones of any other group, they present biological difficulties in that, as no doubt happens with other pheromones, they elicit at small and great concentrations quite distinct but equally important responses from recipient insects. Furthermore, as work has proceeded during the last decade, the problems have been seen to be more, rather than less, complex than was first thought, as many pheromones are being found to be mixtures of several compounds, sometimes acting synergistically. In other cases a series of stimuli are necessary. For instance, an insect that has found a potential mate, or