Book Reviews

Grundriss der Genetik. By Elisabeth Günther. (Pp. 503; 297 figures + 50 tables. 40.30 M.) Jena: Gustav Fischer. 1969.

This textbook, mainly written for East German students, is a comprehensive and in many ways excellent introduction to molecular and classical genetics. In her preface the author states that she has, during her preparation of the book, been perpetually overtaken by so much recent fundamental work, that she had to give up the struggle to be quite up to date. But considering the relative difficulties with the literature at her place of work (Greifswald), she has overcome the pitfall of being parochial very well. For the Western reader it is nevertheless salutary to realize how well one can cover many fields of genetics, without any reference to many of our household names, and how much solid work done for instance in plant breeding in East Germany is practically unknown here.

By its nature and design the book is largely concerned with microorganisms, plants, and animals, and is not particularly suitable as an introduction to human genetics, it in no way aspires to cover clinical or pathological matters. To the reviewer its main virtue appears to be the awareness—often lost in this time of overspecialization—that genetics is an integral part of biology and not just an intellectual exercise. Most useful for the non-German teacher of genetics are the copious and excellent line drawings.

H. KALMUS

Nucleic Acid Metabolism Cell Differentiation and Cancer Growth: Proceedings of the second international symposium for cellular chemistry. Ed. by E. V. Cowdry and S. Seno. (Pp. xviii + 483; illus. £8.) Oxford: Pergamon. 1969.

Nucleic Acids in Immunology. Ed. by Otto J. Plescia and Werner Braun. (Pp. xvii + 724; 195 figures and 1 colourplate. DM. 88.) Berlin: Springer. 1968.

Replication of DNA in Micro-organisms. Cold Spring Harbor Symposia on Quantitative Biology, Volume 33. (Pp. xxii + 884; illus. $20 including postage.) Long Island, New York: Cold Spring Harbor Laboratory. 1968.

It has been suggested that one of the most remarkable properties of nucleic acids is their stimulatory effect on the reproduction and multiplication of symposia. These three volumes contain 174 papers given at three symposia. The oversatiated reader may well wonder if all these had to be published, and indeed whether the impact of the important contributions has not been diminished by papers which are of interest only to the extreme specialist.

These strictures apply mainly to the first of these symposia, that organized by the Japan Society of Cell Biology. The symposium hardly merits the title 'International', and is a hotch-potch of only lightly related subjects. The main sections are: transcription; RNA-protein synthesis and cell differentiation; cell multiplication and differentiation; control of cell growth, cell transformation and cancer induction by virus.

The second symposium was one of a series organized at the Institute of Microbiology, Rutgers University, 'to provide a forum for the discussion and dissemination of information covering timely topics of wide interest'. The organizers recognized that though the biochemistry of nucleic acids and immunology are two major fields of study, there has been a lack of direct contact between them. This is a valuable function for a symposium as this volume attests. The papers make valuable and interesting reading, whether you approach them as a student of nucleic acids (who ought to know something of the role of nucleic acids in immunology) or as an immunologist whose results often depend on the activity of the nucleic acids. The greatest benefit will be derived by cellular biologists and geneticists who will find much of importance in this symposium. The main sections deal with the following subjects: oligo- and polynucleotides as haptens; use of nucleic acid-specific antibodies (including their use in studying the structure of chromosomes); the role of the carrier in the production of hapten-specific antibodies (including a discussion of how the carrier may modify the specificity of the immune response to the nucleotide hapten); nucleic acids as non-specific stimulators of immune responses and the role of nucleic acids in the formation of specific antibodies. The book ends with a brilliant survey by Melvin Cohn on 'The molecular biology of expectation', dealing with the question of the three mechanisms by which an individual or a cell can react in an adaptive way to an unexpected stimulus; namely immune, detoxifying, and learning mechanisms. Are 'silent genes' expressed in an essential but unknown function or are they 'fossils' of evolution?

Ever since 1933 Cold Spring Harbor Symposia have been the essential reference collection containing the latest work by major workers in a topical aspect of quantitative biology. This volume is no exception. It contains 93 articles all dealing directly with some aspect of the title.

The papers are grouped under the following general headings: replication of nucleic acids (including work on DNA and RNA polymerases); intermediates in DNA synthesis (with much on the significance of ligase action); repair of DNA; genetics of replication; structure of replicating DNA (with the concept that DNA can be circular as well as linear); origins of replication; bacterial mating; replication and the cell membrane; replication of temperate viruses and its regulation. The volume is rounded off by a summary by Hotchkiss on 'Metabolism and growth of gene substance: 1968'; this should be widely read. He points out that *x*-ray analysis is valuable for the structure of DNA in all its forms, but is less helpful for understanding the protein of the essential DNA-protein complexes because of the readiness with which the protein molecule 'breathes, unfolds and changes in water . . .'. His survey highlights the importance of polynucleotide ligases in joining breaks in single strands of DNA, and how they interact with the polymerases; he also emphasizes differences between what is observed in the test-tube and what occurs in life. Indeed, it is sobering for an old-fashioned geneticist to see how much 'genetics' is based on bacteria, viruses, and bacteriophage, which, in the old sense, had no 'honest' chromosomes until the new Genetics redefined the gene. Now, with such volumes as this, we know a great deal about 'the gene' (new currency); I wonder whether we know much more than we did about the 'old gene', which sat on a chromosome in a mammalian or plant cell, and showed position effect and true recombination?

J. CHAYEN

Progress in Medical Genetics. Volume VI. Edited by Arthur Steinberg and Alexander G. Bearn. (Pp. viii + 288; figures + tables. 150s.) London: William Heinemann Medical Books. 1969.

As authoritative up-to-date reviews of various aspects of medical genetics, this series has now become well established, and the present volume maintains a high standard of scholarship.

D. H. Carr reviews the present state of chromosomal abnormalities in clinical medicine. Clearly such a review, in the space allowed, could not be exhaustive and the author has therefore concentrated on the most significant contributions. Carr has been responsible for much of the work on chromosome abnormalities in spontaneous abortions and this subject is dealt with in some depth. As the author points out, in view of the high abortion rate of chromosomally abnormal zygotes before the 16th week of gestation, it is perhaps questionable whether or not amniocentesis for the purposes of antenatal diagnosis should be attempted sooner than this. Carr also discusses the recent interesting observation that certain types of chromosomal abnormality (polyploidy and XO) are particularly frequent among abortions of women who become pregnant shortly after discontinuing oral contraception.

The review of the genetics of the gastro-intestinal system by R. B. McConnell clearly illustrates that simple Mendelian principles cannot explain the familial incidences of many of these disorders. The association between gastro-intestinal pathology and the blood groups is reviewed in detail, and what is so far known about genetic factors in Hirschsprung's disease, Crohn's disease, ulcerative colitis, and the various types of polyposis is also discussed. In contrast to the gastro-intestinal disorders, the biochemical mechanisms underlying many of the hereditary disorders of the thyroid gland have now been identified. However, in G. R. Fraser's review of this subject it is clear that there are still many unsolved problems. The pathogenesis of the majority of thyroid abnormalities is extremely complex involving both genetic and enviromental factors, and there is so far no satisfactory explanation for the fact that all forms of thyroid disease are more frequent or more severe in females than in males.

Immune mechanisms directed either to one's own antigens or to foreign antigens are reviewed, respectively, by P. J. Fialkow (genetic aspects of autoimmunity) and F. H. Bach (genetic and practical considerations of histocompatibility in man). Both these chapters are thought provoking. On the one hand Fialkow discusses the increased frequency of tissue-specific antibodies in affected individuals and their relatives with various so-called autoimmune diseases (perhaps a better term would be 'autosensitive'). Bach considers possible genetic interpretations for the results of leucocyte typing studies in families.

Jacob and Monod in 1961 proposed a theory, based on their work on bacteria, which emphasized the importance of regulatory genes in controlling gene activity. J. C. Dreyfus considers in detail the application of these ideas to human genetics, and concludes that the vast majority of hereditary biochemical disorders in man are due to mutations of *structural* genes. Dreyfus found only two diseases which might be attributed to control gene mutations: the erythrocytic porphyrias which might be due to a regulator negative mutation, and von Willebrand's disease which might be due to a super-repressor type mutation.

In a final chapter, E. Eggermont reviews the genetics of intestinal carbohydrate intolerance. Sucrose intolerance with a deficiency of sucrase as well as isomaltase, maltase, and γ-amylase is perhaps comparable to oroticaciduria in which there is a deficiency of orotidylic acid pyrophosphorylase, and decarboxylase. Both these disorders might be interpreted as being due to operon mutations and this is discussed by J. C. Dreyfus.

This book can be unreservedly recommended to anyone interested in medical genetics.

A. E. H. EMERY

The Chromosome Disorders. An Introduction for Clinicians. 2nd ed. By G. H. Valentine. (Pp. xiv + 172; 86 figures. 35s.) London: William Heinemann Medical Books. 1969.

This is the second edition of that highly readable little book on human cytogenetics aimed at the clinician and