Sex Chromosomes and Sex Linked Genes. (Vol. 1. Monographs on Endocrinology.) By Susumu Ohno. (Pp. x+192; 33 figures. DM 38; $9.50.) Berlin, Heidelberg, New York: Springer Verlag. 1967.

This monograph, the first in a series on Endocrinology, might seem to depart from the general theme of the series, being almost entirely cytological and cytogenetic in content and approach. However, once it is realized that the basis of sex determination is perhaps the basis of a large part of reproductive endocrinology, then it becomes logical to begin with a volume on this subject.

The author in his preface quotes an old Arabian proverb about the horse and the camel as an apologia for the single authorship of this volume. There is, however, no doubt that too many multi-author books are produced today and the result often leaves much to be desired. The reader is very quickly left in no doubt that the present volume represents the personal views and ideas of the author on such topics as the evolution of vertebrate sex chromosomes, the evolution of dosage compensation for sex-linked genes, and finally the mechanism of sex determination and sex-determining genes.

The book is readable and stimulating and collects together a great deal of data, much of it the result of the author's own work. One of the problems for the reader of this book is to sort out fact from theory and to know when the author is discussing accepted facts and when he is discussing hypothetical problems which he considers proven. For instance, Dr. Ohno writes as though the homology of the X throughout the vertebrate lineage is proven, when it is not. It is an interesting hypothesis supported by a great deal of circumstantial evidence. He writes as though his ideas on the mechanism of evolution of the heteromorphic sex chromosomes from a homomorphic pair are proven. Again, it is not, but is an interesting and stimulating hypothesis. On the basis of DNA measurements of relatively few species, he reconstructs the whole evolution of the vertebrate genome; interesting and useful speculations, but not fact, though many of his ideas may indeed be correct.

Dr. Ohno has done a great deal of work in these and related fields himself, and in particular in such subjects as derivation of the sex chromatin, conservation of the mammalian X, and the universality of X-linked genes in the placental mammals, and his book, like his conversation, is stimulating and thought provoking. Perhaps the weakest part of this book is Section 3, in which he deals with the fascinating subject of sex determination and especially considers how the sex-determining factors act. He considers that the sex-determining factors act through a common somatic embryonic blastema which develops either a testicular or ovarian structure, dependent on whether the sex chromosomes are XY or XX. He considers that the action of the X or Y is on the metabolic pathway of the steroids, the Y influencing androgen production and as a result a testis, and the X oestrogen production and an ovary. He refers to oestrogen-producing follicular cells, by which we presume he means granulosa cells, and for which there is considerable evidence that they do not produce oestrogen. He also implies that follicular (? granulosa) cells are homologous with the interstitial cells or Leydig cells in the testis. Again there is some evidence that they are in fact homologous with the Sertoli cells in the testis.

Finally, he concludes that the act of sex determination, whether the indifferent gonad develops into a testis or an ovary, is a decision of the type of differentiation to be followed by the 'Common somatic blastema' and not the effect of the arrival of a particular type of primordial germ cells. This is almost certainly correct. He cites as evidence the formation of a testis in the XY and ovaries in XX mice homozygous for the W,W^v, or W^1, alleles which cause among other things a deficiency of primordial germ cells. Some are, however, present, and these might well be sufficient to determine the type of gonad. The whole question of how the sex-determining factors act is still not entirely clear and requires yet further work.

On the whole this is a useful book, representing very much the work of one man, and it is in this way it should be read. It is of particular interest to research workers interested in problems of sex determination and development. It is well produced, well illustrated, and its price is reasonable. It is to be hoped that the following monographs in this series reach as high a standard.

JOHN L. HAMERTON

Humangenetik. Ein kurzes Handbuch in fünf Bänden. Band I/1 Grundlinien, Terminologie, Methoden, Geschichte der Humangenetik, Abstammungsgeschichte, Chromosomen, Mass und Formmerkmale, Entwicklung, Konstitution, Geschlecht, Normale Merkmale von Haut-und Anhanggebilden. Edited by P. E. Becker. (Pp. xv+535; illustrated+tables. DM. 198.) Stuttgart: Georg Thieme Verlag. 1968.

Humangenetik, first planned 10 years ago as a 3-volume textbook, has grown to an encyclopaedia of 9 volumes (5 'volumes', of which 2 are in 2 parts and one is to be in 3 parts). Of the 9 volumes planned, 6 have appeared by now and the present book is the first of the introductory text on basic aspects.

Here the elements of human genetics are dealt with adequately in a concise chapter by W. Lenz of Göttingen, who also contributes in tabular form a history of human genetics which begins with Homer and Hippocrates and ends with references to a paper in 1965 on cellular localization of immunoglobins and to one in 1966 on an autosomal haemoglobin. The rest of the volume deals mostly with biological, anthropological, and developmental aspects. Heberer (Göttingen) devotes a chapter to the evolution of hominoidea and another to the chromosomes of man. More than a third of this book is contributed by Knussmann of the anthropological institute at Mainz, who gives an exhaustive survey of the methodology and data of bodily size, form, development, growth, constitution, and sexual differences. The two concluding chapters are relatively short. Walter (Mainz) discusses in similar terms the mass and form of the head and face, while Jürgens (Kiel) deals with the constitutional and genetic aspects of the normal skin and its appendages.

The scope of this admirable volume can be gauged by the contents of the promised second and third parts: one will deal with somatic features, dermatoglyphs, and intelligence and character, while the other will be devoted to blood groups and blood factors.

ARNOLD SORSBY

Recent Results in Cancer Research. Editor in Chief, P. Rentchnick. Vol. 12. Hereditary Factors in Carcinoma. By Henry T. Lynch. (Pp. xiv+186; 17 figures. DM 24. $6.00.) Berlin, Heidelberg, New York: Springer-Verlag. 1967.

In the end I had to admit I enjoyed this book for it does bring together in a clinical way most of what is known about the role of inheritance in human cancers. The subject matter includes, of course, not only the classical examples of 'single gene' malignancies, but also the part played by heredity in common conditions such as cancer of the breast, stomach, colon, lung, prostate, and endometrium. The reticuloses, congenital cancer, and congenital abnormalities associated with cancer also receive special attention, and it is good to see negative as well as positive genetic data presented. Of the 12 chapters, 10 (cancer families and cancer and genetic counselling included) are by Lynch himself, but the nervous system is dealt with by Aita, and 'Heredity, emotions and carcinoma: delay in cancer detection', by Anne Krush.

One can sympathize with Lynch in the difficulties he had in deciding on the titles of his chapter headings, and on the whole the book divides up fairly well, though the only safe way to find out what is in it is to read through all the table of contents. This is because *there is no index*, a lack which to this reviewer needed a lot of counteracting.

For a second edition, the following alterations and additions are suggested. (1) A general index. (2) An author index, or alternatively, for the book is short, to put all the references at the end instead of after each chapter. (3) Mention the alleged low incidence of cancer in allergic people (W. D. Mackay (1966). *Brit. J. Cancer*, **20**, 434); the role, possibly an inherited one, of steroid levels in cancer of the breast (Bulbrook *et al.* (1962). *Lancet*, **2**, 1238); Veale's monograph on intestine polyposis (A. M. O. Veale (1965). *Intestinal Polyposis*. Eugenics Laboratory Memoirs, **40**. Cambridge University Press.)

C. A. CLARKE

Surveys, Symposia, and Transactions

Progress in Medical Genetics, Volume V. Edited by Arthur G. Steinberg and Alexander G. Bearn. Pp. vii+151; illustrated+tables. 67s. 6d.) London: William Heinemann Medical Books. 1967.

This volume of *Progress in Medical Genetics* begins with a stimulating philosophical account by Professor Dubos of the essential interaction of inheritance and environment. Though we now accept that this interaction is almost always present in the pre- and postnatal determination of phenotypic characters, it is interesting to be reminded that inheritance and environment were for long thought of as almost exclusive alternatives.

Similarly, it used to be said that bacterial and human geneticists spoke different languages, and one could perhaps feel that communication between them was of little value anyway. This complacency has been permanently shattered since many of the principles of gene action and interaction in bacteria now appear to have their analogy in mammalian biology. Our concepts of genes and the way in which they operate to induce normal variation and disease in man have been greatly modified by these fundamental advances. In no field has this occurred more impressively than in the successful exploration of the haemoglobin molecule. This is superbly illustrated in the chapter on the thalassaemias by Dr. D. J. Weatherall. Genetically orientated research has here played a critical role in elucidating the fundamental pathological processes involved. If diseases ever become amenable to deliberate molecular manipulation, the first example is likely to be found in the haemoglobinopathies.

The porphyria story is equally fascinating. Like the disorders associated with abnormal haemoglobin molecules, inherited and environmental factors can be seen to be interacting in a definable if not perfectly understood way. In some respects, workers like Professor Waldenström have had a harder task since they began their studies and made much progress long before anything significant was known of the manner of gene action and, in addition, the porphyrins are a stage more remote from the DNA powerhouse than are the haemoglobins. Nevertheless, a fascinating story emerges from this section on a royal malady. One minor criticism is that it is difficult to comprehend some of the otherwise excellent figures because abbreviations are not explained in the legends. However, the text usually brings comprehension.

Professor Sherlock reviews clearly and briefly those liver disorders associated with jaundice which may have a genetic basis. In this group clinical entities are fairly well defined, but with the exception of one or two conditions, like Wilson's disease and galactosaemia, the precise role of inheritance is unknown. One must agree with Professor Sherlock that several of them 'must at least be familial'. Whether this involves the activity of rare recessive genes, sporadic mutations, or multifactorial inheritance remains largely obscure.

In comparison with the clarity with which the haemoglobinopathies and porphyrias can be viewed and the at least clinical precision of liver disease, inherited muscle abnormalities remain relatively poorly defined. The comprehensive article by Drs. Emery and Walton highlights the paucity of knowledge about the basic pathological processes involved, and they review the inherited muscle diseases in clear but necessarily descriptive terms.

Until the causal link between gene and damaged muscle is defined in biochemical terms little advance in understanding can occur. Are phenotypically similar, but genetically distinct variations of Duchenne dystrophy,