

some may question how far this is of psychological origin or the result of associated fresh air and exercise. The benefits to be obtained from exposure to so-called artificial sunlight are far more open to question. This is only one of the controversial subjects discussed in the book under review—discussed, one may add, in no controversial spirit, for the author states his case with almost evangelical conviction which leaves little room for heretical questioning.

One of the most interesting sections of the book is that dealing with the germicidal effects of ultra-violet radiation. The importance of this subject is now fully established and is well brought out in the excellent symposium on aerobiology published in 1942 by the American Association for the Advancement of Science. In Great Britain experimental germicidal lamps have given good results in certain industrial processes which have to be carried out under sterile conditions. British medical interest in the bactericidal possibilities of ultra-violet radiation has, however, been slow to develop.

The book seems to have been put together hurriedly and is, in consequence, sorely in need of careful editing and vigorous pruning. There is much needless repetition and overlapping; some of the sections, for example, that on ultra-violet energy and plant life, are inconclusive and do not appear to lead anywhere. Too much space is devoted to the author's proposals for systems of units for biological effectiveness of ultra-violet energy analogous to those in use for visible radiation. It may, perhaps, be questioned how far these are justified or will find general acceptance.

Most of the discussions centre around the work of the author and his colleagues; there is, however, a fairly comprehensive bibliography. The various discharge lamps and other artificial sources mentioned are those commonly marketed in the United States, but similar sources are available in Great Britain and elsewhere. Despite its defects, the book should be studied by all who are interested in the biological effects of radiation within the range of the sun's spectrum.

H. G. JENKINS

THE ARGUMENT FROM MOUSE TO MAN

Animal Genetics and Medicine

By Dr. Hans Grüneberg. Pp. xii+296. (London: Hamish Hamilton Medical Books, 1947.) 21s. net.

DR. GRÜNEBERG'S new book covers some of the same ground as his well-known monograph on the "Genetics of the Mouse". But the genetic facts he brings forward, although drawn from a narrower field than might be expected from his title, relate to the rodents as a whole rather than to the mouse in particular. His volume provides, in a simple and readable form, the most complete available summary of our knowledge of inherited pathological conditions in this whole group, and will be, for that reason alone, extremely welcome to genetical workers in other fields. As in his previous book, it is a particularly valuable feature that he describes not merely the final adult form of the abnormality, but also as much as is known of its developmental antecedents.

The purpose of the book goes much beyond that of a mere summary. Dr. Grüneberg has written his book in the hope "that it will help to make the geneticist more fully alive to the medical value of his material, and that it will show the medical practitioner that invaluable sources of information are only waiting to be opened up by him". The application which Grüneberg wishes to make of the wealth of factual material he presents is partly at a theoretical level. He shows how the animal geneticist, by the use of controlled breeding, can easily discover whether two apparently rather different abnormalities are, in fact, due to the same ultimate genetic cause. If they are, they may legitimately be considered as two aspects of a single unitary disease. An argument of this type is, the author holds, the only kind which can make possible a logically unassailable classification of the clinical conditions in which hereditary disposition plays a large part. Unfortunately, the crucial test of breeding cannot be applied in a controlled manner to human material; but less direct ways of applying the same concepts are sometimes feasible, and the genetic criterion at least indicates the goal towards which effort should be directed.

The other main advantage enjoyed by the animal breeder is the ability to produce as many animals as he pleases of the pathological strain. This makes it possible to carry out an adequate analysis of the epigenetic processes by which the abnormality is produced. Grüneberg has himself made several noteworthy advances in this connexion, showing, to mention only one example, how a complex of apparently unrelated effects in a certain strain of rats may be traced back to an initial hypertrophy of the cartilage. Such studies are scarcely possible for human material. Indeed, some medical men may be tempted to dismiss them as unnecessary for clinical practice, since there is still a tendency to consider pathological conditions as either physiologically conditioned (when they may be curable), or as hereditary (in which case nothing, it is assumed, can be done to obviate them). Such a view is, of course, indefensible. Grüneberg quotes with approval Sewall Wright's dictum that "the attitude of physiological genetics is that characters are determined 100 per cent by physiological processes, and that genes are the ultimate physiological agents". Genetics has already made an important contribution to the detection and conservative treatment of sub-clinical diabetes, and it may be expected to render many more such services to therapeutics.

The numerous genetically controlled developmental processes described by Grüneberg have an important bearing on the fundamental biological problem of the mode of action of genes. In discussing these, the author is perhaps not always so convincing as when he is exhibiting the relevance of his material to medical questions. For example, the discussion of whether gene-action is organ-specific or tissue-specific is surely based on a question which does not go deep enough. Some genes, if classified in such terms at all, could only be called organ-specific (for example, aristopedia or bar eye in *Drosophila*); others would appear (contrary to Grüneberg's statement) to affect more than one type of tissue (for example, the 'white' gene in *Drosophila* also reduces pigment in the testis sheath). Surely the true state of affairs is that a gene is specific for one chemical process, which may be involved in one or a number of different tissue- or organ-differentiations.

C. H. WADDINGTON