

leads inevitably to cancer. The present state of knowledge of morphology in 'pre-cancerous' lesions does not permit an accurate prediction of the direction along which the lesion will proceed. This book should undoubtedly be available in all medical libraries and institutions associated with cancer research.

H. JACKSON

PHYSIOLOGY OF COLOUR CHANGE

The Control of Chromatophores

(International Series of Monographs on Pure and Applied Biology: Zoology, No. 14.) By M. Fingerman. Pp. ix+184. (Oxford, London, New York and Paris: Pergamon Press, 1963.) 50s.

THE physiology of colour change is a big subject and includes a study of receptor, integrative and effector mechanisms. This monograph has something to offer to workers in all these fields. It deals principally with publications since the appearance of G. H. Parker's monograph in 1948 (*Animal Colour Changes and Their Neurohumours*) and it should be read in conjunction with this, for it necessarily omits many topics which are treated in considerable detail in the earlier book and which have been little pursued since that was written. When reading such a monograph on recent work, one may also easily lose sight of the fact that credit is tacitly being given to the wrong person for first discerning a path of investigation. The first person to open a new line of enquiry should be mentioned in a review, however long ago he did his work. For example (p. 16), the first investigator to indicate the significance of separate illumination of the dorsal and ventral regions of the retina was K. von Frisch in 1911.

The author remarks that since the publication of Parker's monograph many advances have been made in our understanding of the control of colour changes, particularly among the invertebrates. This is reflected in the fact that 66 pages are devoted to the crustaceans compared with 43 for the vertebrates. Furthermore, a great proportion of the latter deals with older work. Relatively little has been published on invertebrate groups other than crustaceans and, in this review, insects get 8, cephalopods 4 and echinoderms 3 pages each. The emphasis of the present volume is on so-called "physiological" colour change. "Morphological" colour change and a treatment of chromatophores as such receive little attention. Further, the literature quoted does not include any work from the U.S.S.R. and only three papers from Eastern Europe. This is a pity.

The very considerable amount of work which has been done on crustacean colour changes (a great deal of it by the author himself) is excellently summarized, and the reader can quickly orientate himself in a mass of facts which, only too easily, could have been confusing.

The section on vertebrate chromatophores indicates clearly that little progress has been made in solving many of the problems of Parker's day. On p. 100 (and elsewhere later) it is stated that the melanophores of some fish are under the influence of nerves alone and that hormones play no part in their control. This may well be so. However, the role of hormones is often masked by the more obvious nervous control and so far there is no truly indisputable evidence for the statement, in spite of several assertions to the contrary in the literature. Again, often-repeated opinion regarding the existence of a double innervation of teleost melanophores by pigment-aggregating and pigment-dispersing fibres has tended to become dogma. While the results of some of Parker's experiments on tail-bands cannot be queried, his interpretations have often been criticized. The experiments of Parker and Rosenbluth (quoted on p. 116) should be repeated much more carefully before we conclude from them that "pigment-concentrating and pigment-dispersing

fibres" are present. Again (p. 118), von Gelei's evidence for "melanin-dispersing fibres" in *Phoxinus* is inadequate and open to other interpretations. There may be a double innervation, but the evidence in favour of it is not nearly so good as the present review suggests.

Recent work on the part played by pituitary hormones in vertebrate colour changes is well discussed. In this connexion, H. R. Hewer should be given the credit for first observing the paling of minnows after they have been injected with minnow pituitary extract. The recent work of A. K. Kent unfortunately appeared too late to be included.

A small blemish in the writing is the use of "feeling". To say that after experiments an author "felt" that the interpretation must be so-and-so is an unhappy expression. Hunches (good and bad) are common enough when we embark on experiments, but "feelings" regarding interpretations of results can only too easily become "facts". However, in general, the style of the writing is good and the book is happily free from those undigested chunks of potted information which can turn reviews into an irritating collection of statements the links of which are often far from apparent. Throughout the book the author makes successful efforts to clarify and simplify the nomenclature and to reduce to order the confusion of terms which have been associated with colour change or with the more general aspects of neurosecretion and endocrine control. As a result of all the work and care which have clearly gone into the preparation of this book, it is pleasantly easy to read and its clear presentation will make it most valuable in any comparative physiological library. For research workers in the field of colour change it is a necessity.

E. G. HEALEY

LORE OF THE CHICKEN

Aldrovandi on Chickens

The Ornithology of Ulisse Aldrovandi (1600), Vol. 11, Book XIV. Pp. xxxvi+447. Translated from the Latin with introduction, contents and notes by L. R. Lind. (Norman, Oklahoma: University of Oklahoma Press, 1963.) 55s. 6d.; 6.95 dollars.

SINCE newly hatched chicks may imprint on humans who care for them in the absence of their mother, it seems likely that the first association between man and fowl occurred by chance many times in many places. The social habits of fowls would also permit the establishment of flocks, and it is certain that this domestication was completed more than 4,000 years ago in the Indus Valley. Early breeding seems first to have been related to sport (or possibly for meat) since ancient femur bones are about twice the length of those of the wild progenitor, the jungle fowl. Perhaps size alone was a desirable character; but as the Sumerian language has a word only for the cock, it seems more probable that interest centred around the peculiarities of the male; his courage in fighting, his apparent pride and his sexual prowess. By the fifteenth century B.C., domesticated fowls were established in Egypt, but it is not clear if they survived Tutankhamen's reorganization of that society. The fowl seems to have reached the West, instead, by spreading from India to Persia. It was established there by 1000 B.C., had claimed its civilizing role as a 'timepiece', and had become associated with Zoroasterism. The Greeks of 500 B.C. recognized its Persian source and immortalized it as a divine symbol of light, of health and of sexual potency, and used it widely in fighting-games. Later, when the nutrient store of the egg also came to be exploited, the female became a symbol of fertility. The fowl was then an integrated component of Mediterranean civilization; of nutritional, social and symbolic significance.

Almost 2,000 years later, the Italian naturalist, Aldrovandi, summarized the then existing knowledge of the