

One cannot pay too high a tribute to the skill of the editors, who have managed to weld some twenty separate contributions and associated discussions into a coherent and masterly volume that should serve as a valuable reference work for several years to come. As they state in the preface "... the objectives of precision in nutrition can only be built upon a more complete knowledge of the basic biochemistry and physiology" of pigs and poultry. Although these objectives have not yet been reached and our basic biochemical and physiological knowledge is far from complete, this volume admirably indicates how far we have advanced, and as such it is to be commended to all with interests in the nutrition of pigs and poultry.

A. EDEN

DOMESTICATION AND BEHAVIOUR OF ANIMALS

The Behaviour of Domestic Animals

Edited by Prof. E. S. E. Hafez. Pp. xiv+619+21 plates. (London: Bailliere, Tindall and Cox, Ltd., 1962.) 75s. net.

THE origin and adaptiveness of the races of domestic animals is a topic of wide interest, for it is a field in which the zoologist, the comparative anatomist, the ethologist, the physiologist, the farmer, the animal trainer, the psychologist, the anthropologist and the archaeologist all have a stake. The production, therefore of a massive book on the subject raises high hopes and this book is indeed a considerable achievement. It is divided into four parts: (1) behaviour and domestication, (2) fundamentals of behaviour, (3) behaviour of mammals, (4) behaviour of birds; together with an epilogue entitled "Comparative Behaviour." Such a large book by so many authors is, however, bound to be very uneven and there is plenty to criticize in individual contributions; moreover, the editors have not succeeded in making any real unity out of a diverse series of topics covered by a diverse collection of authors.

Of the two chapters in Part 1, Scott's introductory essay is too vague and too limited to help the book on very much. E. B. Hale's chapter, on the other hand, entitled "Domestication and the Evolution of Behaviour," contains a good deal of interest; but even he misses out some of the most important points—due, I think, to being insufficiently at home with the modern ethological approach. Thus there is no satisfactory discussion as to the evidence bearing on the nature and evolution of innate or instinctive behaviour from a study of the characteristics of this behaviour in domesticated species. Again, it is well known that, among domestic animals, improperly directed sexual behaviour is particularly common—so common as to be almost a characteristic of domestication. In this connexion it has been argued that those animals most likely to have been domesticated are those which could learn most readily to transfer their responses from individuals of their own species to individuals of the human species. That is to say, species which could be readily imprinted, and so psychologically modified, would be those which would be most likely to respond successfully to attempts at domestication. But a contrary thesis has also been maintained: namely, that under domestication the probability or possibility of imprinting on to biologically inappropriate objects is so much greater than in the wild that there would tend to be selection against the ability to be imprinted during domestication; for if it were not so, imprinting would almost certainly interfere with normal reproduction. Here is an issue of fundamental importance and interest which seems to be almost entirely ignored.

Part 2 commences with J. L. Fuller's chapter on the genetics of behaviour. It is scarcely the author's fault that this is not so interesting as the title might lead one

to expect; behavioural genetics is in fact an extremely difficult subject and—in the higher animals at least—the inheritance seems always to be polygenic. It will be a long time yet before there is enough material to write a satisfactory summary of this subject. Some of the chapters show too exclusive a dependence on the American literature and, in particular, a neglect of the European continental contribution. This is specially evident in what should otherwise have been a valuable chapter, that on physiological mechanisms and behaviour patterns. On the other hand, the chapter on behavioural pharmacology is both unusual and extremely useful. Denenberg in Chapter 6 contributes a valuable discussion on the effects of early experience.

Coming to Part 3, we find chapters written much more from the point of view of the student of animal husbandry. They are interesting, valuable and competent in their way; but they tend too often to be a collection of isolated facts unrelated to the ethological principles underlying the subject. Thus it is almost unbelievable that anyone should set out to write a chapter on the behaviour of dogs and make no mention of the classic work of Schenkel on wolves, or even of the excellent though popular account of the Crysler on the same species, or of Murie on the coyote. Some of Lorenz's work in this field is unjustly neglected, and throughout the whole book the contributions of Hediger on the behaviour of animals in zoos and circuses seems to have been entirely forgotten. Of the mammalian chapters, those on the horse and the cat are perhaps the most thorough and widely based. Part 4, which deals with bird behaviour, contains valuable and original work by Hale and Schein on turkeys, and Collias on ducks. To summarize, the book is in many respects an achievement to be welcomed; but large though it is, its faults are chiefly those of omission and sometimes of too restricted an outlook.

W. H. THORPE

THE REALM OF FISHES

A History of Fishes

By J. R. Norman. Second edition revised by P. H. Greenwood. Pp. xxxi+398. (London: Ernest Benn, Ltd., 1963.) 21s. paperback.

THIS is an extremely interesting and informed book, a revision of a work first published in 1931. Comparison with the original edition reveals that much of the text remains unchanged, as does the general plan of the book; the chapter headings and many of the text figures are the same. Thus, at first glance, the new edition is closely similar to the old, and this gives some idea of the reason for the success of the book (which went through no less than four impressions after the Second World War). Norman's book was a remarkably original one in its emphasis on the study of fishes as living animals, not as museum specimens, and his approach being essentially modern, few alterations have been necessary to the basic plan of the book.

There have, of course, been many advances in our knowledge of fish in the past thirty years, particularly in so far as their physiology and behaviour are concerned, and in the study of fossil forms. Many new fishes have been discovered, some, like the coelocanth, of first importance. On closer inspection, it is evident that the new edition has been very carefully revised to include the results of recent work, and although a few pages shorter than the old, it contains a great deal more information. A number of new text figures have been drawn by the artist who illustrated the first edition, most of these are of fossil forms such as *Jamoytius*, but other new figures are of *Latimeria*, of different forms of the jaws and their articulations, and so on. Although Dr. Greenwood apologizes in his preface for the possible appearance of a dogmatic tone due to the demands of compression, in