

Pleuronectes, Microstomus, Glyptocephalus und Platichthys gezählt werden. Vor allen Dingen ist die bisherige Gattung Pleuronectes in mehrere einzelne Gattungen, nämlich in die fünf zuletzt genannten, aufgeteilt. Von den bekannten nordeuropäischen Plattfischen, die allgemein unter der Gattung Pleuronectes zusammengefasst werden, sind *Pl. limanda* der besonderen Gattung Limanda als *L. Limanda*, *Pl. microcephalus* der Gattung Microstomus als *M. kitt*, *Pl. cynoglossus* der Gattung Glyptocephalus als *Gl. cynoglossus* und *Pl. flesus* der Gattung Platichthys als *Platichthys flesus* zugeteilt. Diese weitgehende Aufteilung der Gattung Pleuronectes, der nur die beiden Arten *Pl. platessa* und *Pl. pallasii* (= *quadrituberculatus*) belassen sind, dürfte wohl kaum allgemeine Zustimmung finden. Man könnte es allenfalls, besonders unter Berücksichtigung der Entwicklung, verstehen, wenn *Pl. microcephalus* und *cynoglossus* eine Sonderstellung gegenüber den anderen Pleuronectes-Arten eingeräumt würde, jedoch *Pl. platessa* und *Pl. limanda*, vor allem aber *Pl. platessa* und *Pl. flesus* als besondere Gattungen voneinander zu trennen, muss doch als etwas zu weitgehend angesehen werden. Vor allen Dingen ist es aber zweifelhaft, ob es zweckmässig ist, eine allgemein eingebürgerte Gliederung und Benennung so grundlegend zu ändern.

Wenn man auch betreffs der Systematik und der einen oder anderen sonstigen Sache nicht immer der Ansicht Normans beistimmen kann, so ist doch das Werk als Ganzes wertvoll genug, um nicht nur Beachtung zu finden, sondern auch um mancherlei Anregungen zu geben.

Schnakenbeck.

E. S. Russell. "The Behaviour of Animals: An Introduction to its Study". Edward Arnold & Co., London, 1934.

A growing realisation that reflex physiology is not a satisfactory substitute for a science of animal behaviour has resulted in recent years in a tendency for observers to develop the subject along its own lines. Dr. E. S. Russell, who has for a long time been warning biologists not to allow themselves to be imposed on by the mouth-pieces of the inorganic sciences, is among the pioneers of a movement which emphasises the importance of approaching behaviour problems without distorting them, on the one hand, with unnecessary preconceptions of a mechanistic nature, or, on the other hand, with ideas derived from subjective psychology.

In a series of lectures delivered at University College, London, in 1933, Dr. Russell dealt with the main aspects of animal behaviour considered from this attitude, and the substance of them is now presented in book form. The latter makes an eminently readable sketch — as the author's name alone guarantees — rich in well-presented examples of a wide range of behaviour activities. Much of the growing literature on behaviour being scattered and little known, zoologists may find here and in the works to which attention is drawn, many facts which will be new to them. The straightforward descriptions and the easy style should serve the first object of the book: to interest all classes of readers in the study of animal behaviour and the problems it presents.

Though the author wishes to avoid more profound theoretical issues, and aims at describing in an unbiassed manner the facts of animal behaviour as directly observed, he has certain definite opinions as to the sort of

meaning that is to be ascribed to such facts — how they are to be assimilated. Indeed, the second object of the book, according to the wrapper, is to make clear the principles on which observations should be interpreted. Though this is evidently an over-statement, the author nevertheless reviews the facts in the light of certain general conceptions, whose validity, it appears, rests on the fact that they themselves are derived from the contemplation of the observed data. Apparently, too, these conceptions have to be taken on trust; no attempt is made to examine them critically or even to indicate that such examination is required. A case in point is the underlying assumption, in the chapters which deal with maintenance activities, that behaviour is directed to serve some need. Presumably this is to apply to activity through any arbitrarily delimited period, and the needs served may be those of the individual, or of the community, or of the race during successive generations. Clearly more precise formulation is necessary before the idea can be of service as a scientific hypothesis. In short, a good deal more thought will have to be applied before the principles on which behaviour is to be interpreted can even be pictured.

Much, however, may be said in favour of the general scheme of pigeon-holing our knowledge which the author's views have led him to adopt. It is gratifying to find the ecological aspects of behaviour treated at an early stage, as an apt reminder that the study of behaviour begins in the field, and not, for instance, with experiments on the galvanotropism of prawns. For the sake of the merits which the standpoint possesses, it should further be pointed out that the insistence on the inadequacy of the "causal-analytical" method is liable to misunderstanding. A clear distinction is scarcely made between the actual analytical *method of investigation*, and that form of *interpretation* which assumes that the results of analysis tell us all there is to know of the events analysed. Analysis is, of course, an essential method of exploring natural phenomena, and a good deal of analysis is implicit in many of the "direct" descriptions.

Marine zoologists may be gratified to notice the prominence given to marine animals. Considering the handicaps there are in the way of direct field observations and of keeping these animals in a suitable condition in captivity, it may come as a surprise that so many illustrations should have been forthcoming. Research in this sphere is evidently well repaid. Piéron's observations on the homing of limpets; those of the author on the seaward retreat of the hermit-crab *Diogenes*, which exploited the backward tow of the waves; the acquired taste on the part of an anemone *Eloactis* for *Balanoglossus*; the adaptive responses shown by settling larvae of *Botryllus* and *Owenia fusiformis*; the capacity of *Nereis* to form simple associations — these, among other instances, show that animals in the sea can exercise discrimination and control their actions no less than their relatives on land. It is now also being appreciated, from our growing knowledge of the facts accumulated by patient research, that the behaviour shown by fish on migration is on no lower plane than that shown by birds.

Of special interest at the present time are observations which show the use of the point of view advocated by the Gestalt theory (simply and admirably treated in the all-too-short final chapter). Many years ago Bateson noted that *Motella tricirrata*, which takes its food off the bottom, would not "recognise" a worm swimming in the water, but it was not until later that Bierens de Haan, in recording a similar observation on an

octopus, drew attention to the significance of cases of this sort. It is clear that the prey itself, as an isolated object — a crab in the latter case — is not a sufficient “stimulus”, but that a “crab-crawling-on-the-bottom-complex”, or some general feature of it at least, is required to evoke a food situation. The relation between an object and its background may be of greater importance than the characters of the object itself. Certain types of conditioning experiment have demonstrated this. Köhler, for instance, found that chicks came to associate the *darker* of two shades of grey with food, irrespective of the actual intensity. Similar results have been obtained with fish.

The book is illustrated with photographs and text-figures. It is a pity, however, in view of the present high standards of bird photography, that a better picture of the squatting herring gull squab was not available.

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