

### A Monograph of the Clingfishes (Order Xenopterygii)

By John C. Briggs. (Stanford Ichthyological Bulletin—Volume 6 complete.) Pp. iv+224+114 figures and 15 maps. (Stanford, Calif.: Natural History Museum of Stanford University, 1955.) 4 dollars.

THE clingfishes are an order of small teleosts with an adhesive thoracic disk supported by elements of the secondary shoulder girdle and the pelvic fins. While they have no spinous rays, except perhaps in the pelvic fins, features such as the number and arrangement of the branchiostegal rays suggest that the clingfishes have sprung from a spiny-finned (percomorph) stock. But this relationship is surely not "obvious", as is stated on p. 7 of this monograph.

As a result of Mr. John C. Briggs's comprehensive survey, this order is seen to consist of ninety-three species, which can be readily arranged into eight subfamilies of the family Gobiesocidae. Twenty-one new species are described and thirteen new genera proposed, which is some measure of how little was known of these fishes, but also of the importance of this valuable, well-illustrated monograph. But Mr. Briggs's main purpose was to trace "... inter-relationships—hence the course of evolution—within a well-defined group of fishes, in so far as this is possible by systematic revision of a group in which fossil evidence is not available". Evolutionary trends have been followed by studying particularly the respiratory complex, the single or double nature of the adhesive disk, and the arrangement and form of the teeth. The conclusions on phylogeny are presented in the form of dendrograms—three-dimensional family trees. But in the present work, at least, it is difficult to see any particular advantage in this type of figure.

Except for certain species of *Gobiesox*, all clingfishes are marine, occurring in the coastal waters of the tropical and warm-temperature regions. In the section on distribution which concludes this monograph, two particularly interesting features emerge. The New Zealand clingfish fauna of eight species covering seven genera would seem to consist of endemic relicts, and the sub-family Gobiesocinae is not entirely confined to the New World: there is one species in South African waters.

N. B. MARSHALL

### Theory of Ordinary Differential Equations

By Prof. Earl A. Coddington and Prof. Norman Levinson. (International Series in Pure and Applied Mathematics.) Pp. xii+429. (London: McGraw-Hill Publishing Company, Ltd., 1955.) 64s.

INCE'S standard treatise, "Ordinary Differential Equations", is now nearly thirty years old, so there is room for a book in English which should revise some of Ince's exposition in the light of modern methods, and extend the field of study to include an account of recent work of importance. This has been accomplished by the present authors, in a terse, compact, closely woven volume; the style is clear but stiff, and the book could scarcely be tackled by even a good honours student before his third year. The language of matrices is employed throughout, and the intending reader must be well acquainted with this language.

After two chapters on existence and uniqueness theorems, there are ten on the linear equation, with a discussion of systems with isolated singularities, and a very thorough treatment of eigen-value and

boundary-value problems, singular and non-singular, self-adjoint and non-self-adjoint. The remaining five chapters supply a firm base from which to attack the important topic of non-linear mechanics, on which so much original work has been done during recent years. Asymptotic behaviour, perturbation theory and topological methods lead the reader to the focus of much present-day research; he should derive much profit from this very forward-looking volume. But he should not neglect the problems attached to each chapter; some of these are quite straightforward, but others, adding to and generalizing the text, may present a severe test of understanding. Altogether, this is a noteworthy addition to the McGraw-Hill International Series in Pure and Applied Mathematics.

### Fuel

Solid, Liquid and Gaseous. By J. S. S. Brame and Dr. J. G. King. Fifth edition, rewritten by Dr. J. G. King. Pp. xii+551. (London: Edward Arnold (Publishers), Ltd., 1955.) 50s. net.

IT is good to see a new edition of this very useful book, especially as the previous edition was published twenty years earlier. As might be expected, such a gap has made necessary the almost complete rewriting of the text, which has taken account of the changes and developments that have occurred in fuel technology in the period concerned.

It is emphasized in the preface that the book deals strictly with the properties of fuels and their methods of application, and not with details of processes of production or utilization of fuels. Nevertheless, there is a lot of helpful information on the latter aspects.

For those unfamiliar with the book it will be necessary to indicate the general scope in a little more detail. The main chapters treat the essential properties of fuels, classification of solid fuels, and give considerable consideration to the classification and composition of coal, followed by discussion of its storage and preparation, carbonization and use for generating steam, power and heat. Next are given details of the various liquid fuels used for heating and power production. There are then three chapters on gaseous fuels, one on fuel analysis, and another on determination of calorific value. The final chapter is concerned with fuel efficiency. At the end of each chapter there are references to further reading.

The volume is of attractive appearance; the matter is well expressed and well printed on good-quality paper, with clear illustrations, and at present prices is very good value. It can be recommended as a very sound text-book.

### Fifty Years of Birdwatching

By A. M. C. Nicholl. Pp. xx+127+12 plates. (London: John Murray (Publishers), Ltd., 1955.) 12s. 6d. net.

MR. A. M. C. NICHOLL is well known as an expert bird-photographer, and he has illustrated this volume of bird reminiscences with some fine examples of his skill with the camera; but this is not a picture book, the illustrations being secondary to the text, which deals with the author's experiences down the years. In a pleasant and chatty manner Mr. Nicholl tells us of much that he has seen and done, often giving us vivid pictures of the English scene and its wild life, coupled with many a shrewd observation on birds and their behaviour.

FRANCES PITT