

geosynclines, and the production and arrangement of metamorphic rocks in the fold-belts receive attention.

So far, so good—the petrological geologist of whatever school (and there are many) can obtain great benefit by careful study of the first half of this volume, however much he may differ from the authors in matters of detail. But it is otherwise with what follows, for the authors consider that metasomatism is a factor of the first importance in the formation, and transformation, of rocks. This view colours their treatment of the main classes of both common and uncommon rocks. The operation of fronts, and especially of the basic front, is favoured as the mechanism in metamorphism, migmatization and granitization. By metasomatism, in the wet or in the dry, it is considered that there are produced, for example, skarns, glaucophane-schists, eclogites, charnockites and innumerable other rocks. Metasomatism provides the first term of the Granite Series and, besides, is held to account for many celebrated intrusive bodies. Thus, it is suggested that the Cortlandt complex may be of metasomatic origin, as may also the great Duluth and Sudbury gabbros—the Bushveld body is held to be certainly so. Further, it is proposed that basic and ultrabasic rocks may be the result of metasomatism; the ophiolites may be in part basic fronts to later granites; the alkaline rocks are dominantly metasomatic. All this is strong doctrine, to be evaluated only by the experienced and the expert.

It is possible, indeed likely, that some of these proposed interpretations are correct—but time alone will show. It is a fair comment to say that the authors are rather uncritical where work advocating metasomatism or the operation of fronts, basic or otherwise, is concerned. Their acceptance of a metasomatic origin of the Bushveld complex is a case in point. The book is intended for the expert who must be expected to match it against his experience—he will obtain pleasure and profit in doing this. But, as was said at the beginning of this review, his pleasure and his profit would have been increased had he the third volume "Orogénèse" beside him. Meanwhile, he can be thankful for this lengthy prologue to the full drama.

H. H. READ

SCIENCE AND BRITISH FISHERIES

Sea Fisheries

Their Investigation in the United Kingdom. Edited by Michael Graham. Pp. xii+487+12 plates. (London: Edward Arnold (Publishers), Ltd., 1956.) 5 guineas net.

I WAS eager to read this book for two reasons mainly. In the first place, I expected it to provide a much-needed and authoritative presentation of methods and findings that would be helpful generally, but more especially to the student seeking guidance and inspiration in the hitherto unfamiliar field of fisheries investigation. Secondly, because fisheries research is little more than sixty years old, I anticipated that the book would for me amount very largely to a chronicle of the work of personal masters, colleagues and friends at home and in Western Europe, whose distinguished researches and influence had pioneered and developed the science to its present advanced stage.

In both respects the book has made most interesting and stimulating personal reading, and is undoubtedly

a treatise of outstanding scientific merit and worth, to be recommended to old and new students alike. It is the composite work of Mr. Michael Graham, director of fisheries research in the Ministry of Agriculture, Fisheries and Food; Dr. C. E. Lucas, director of fisheries research in the Scottish Home Department; Dr. H. A. Cole, Mr. A. C. Simpson and Mr. R. J. H. Beverton, on the scientific staff of the Ministry of Agriculture, Fisheries and Food; Dr. Henry Wood and Mr. R. B. Parrish, deputy director and member of staff respectively of the Marine Laboratory, Aberdeen; and Mr. S. J. Holt, biologist on the staff of the Food and Agriculture Organization of the United Nations. Following a short introduction by the editor, each of the above contributes to form a series of separate essay-chapters, dealing in turn with fisheries of the United Kingdom; plankton and basic production; plankton and fisheries biology; benthos and the shellfish of commerce; the pelagic phase; the cod, haddock and hake; plaice; and the theory of fishing. In a final chapter, the editor gives a synopsis and commentary in review form.

Despite Mr. Graham's recommendation not to do so, I read his synopsis and commentary first, and I am bound to say I was glad I did. For in a little more than eight closely written pages, he succeeds in co-ordinating the subject-matter of the separate essays in a manner that not only reveals the continuity in content, sequence and purpose of the book as a whole, but also provides an impressive and masterly appreciation of the many different kinds of scientific study necessary to a proper understanding and solution of the problems presented by commercial fishing, not excepting the study of the relations between the fisheries and hydrographic conditions, for which, unfortunately, no place for a separate chapter could be found in the present book.

It is a foregone conclusion that this book will rank among those of first importance in standard fisheries literature, and is therefore all the more likely to be recommended to new students of fishery science. Precisely because of this, I feel compelled to criticize Mr. Graham's introductory chapter which, although brief, is nevertheless an introduction—and a powerful one—likely to determine the whole attitude of mind in which the main text will be read. Here, Mr. Graham clearly sets out to press home the very practical and readily acceptable conception of fishery science as "essentially operational research with the aim paramount of elucidating the problems of the commercial fisheries". But in my view, he does so in a way that may well induce any uninitiated reader, at the very outset of his reading, and possibly also of his career, to under-rate, not only the great service of those pioneers who gave us the vast amount of basic knowledge upon which operational research is ultimately dependent, but also the fundamental value of the knowledge itself—knowledge, moreover, that forms an appreciable and inevitable proportion of the main text and its argument. As a constructive suggestion, therefore, I would ask Mr. Graham to consider a re-writing of his introduction in a future edition. For I firmly believe that the objection is valid, and that by dispelling it the value of this already welcome and commendable treatise would be enhanced. Finally, he will, I am sure, share my regret that the purchase price of the book is so high; five guineas is more than many libraries and private students will be able to afford, much as it would be to their advantage to have a copy of their own.

E. FORD