

of growth and recruitment in exploited stocks with special reference to the factors governing them; chapter nine deals with the influence of environmental boundary conditions in the sea on the distributional properties of fish (and hence of their availability to fisheries and, especially in the case of upwelling, on their total production; and finally, in chapter ten, the author presents an assessment of some of the present unknowns in our understanding of the dynamics of exploited fish stocks and some of the avenues along which he considers future research should move towards a better understanding of them. With numerous equations (it is a pity that there is an error in equation (1) on page 9, which should read  $P_2 = P_1 + G + R - Z$ ), eighty-two text figures, numerous references to relevant literature and a glossary of terms, the author has succeeded in packing into only two hundred pages a great deal of important information on a large and complex subject.

In this short review it is not possible to comment specifically on many of the important items of subject matter dealt with in the book, but a notable feature of it is the attention the author gives to the recruitment problem in exploited fish stocks and especially the relation between recruitment and stock size. As well as devoting the whole of chapter eight to a useful review of the underlying theory and current information on the nature of this relationship, he rightly directs attention in chapter six to its importance in assessments of the effects of fishing on exploited stocks and hence in relation to fishery regulation policy and practices. It is evident from the last sentence of that chapter that the author seriously doubts the validity of what he calls "the present dogma that recruitment is independent of stock size . . .". While I agree that there is no room for complacency about the validity of this assumption, I do not think that the existing information for the main exploited stocks of marine teleosts (on which world fish production is principally based) justifies his assertion that it has "outlived (misprinted as "outlined" in the text) its usefulness and might even be dangerous". It is true that the available data cast some doubt on its general validity for some exploited fish stocks, but by no means for all of them. The important thing is that detailed attention is paid in future to the nature of the relationship and of the factors governing recruitment to exploited fish stocks.

The book is based on a series of lectures which the author gave to graduate students at the University of Wisconsin. As such, it is not written as a textbook, but more as an up to date review, addressed to students and teachers at the university level, fisheries biologists and administrators. I recommend it to them.

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## PROPERTIES OF SURFACTANTS

**Solubilization by Surface-active Agents and its Applications in Chemistry and the Biological Sciences**

By P. H. Elworthy, A. T. Florence and C. B. Macfarlane. Pp. 335. (Chapman and Hall: London, June 1968.) 63s.

It is almost fifteen years since general accounts of the solvent properties of surface-active agents appeared in two books, one by Mary McBain and Hutchinson and the other by Winsor. This new book will therefore attract the attention of many workers in pure and applied science looking for an up to date discussion of the field.

A general account of micellization is given in the first chapter, which wisely avoids too much repetition of the ground work covered in earlier books and the rather sterile McBain-Hartley controversies. Much of the discussion is illustrated by results from recent investigations, a useful feature for those familiar with the earlier work. The pseudo-phase and mass-action theories of micelle formation are briefly considered on pages 48-52. A point clearly

made is that many experimental measurements are insufficiently accurate to distinguish between the two theories. Figures 1.18 and 1.19 illustrate this particularly well.

Basic work on solubilization is rather briefly reviewed in the second chapter. It is only too obvious that a fundamental description of the process is still far off, although the qualitative picture has advanced considerably since the earlier books mentioned previously.

Pharmaceutical applications of solubilization are comprehensively dealt with in the following chapter. The authors have broadened their approach to include the phenomena of hydrotrophy and complex formation.

A number of basic problems have arisen in the use of surface-active agents for solvent purposes in pharmacy, and the authors have regrouped the data in the fourth chapter to emphasize some of these; for example, effects on drug activity, and drug absorption and stability.

The use of solubilization in the production of cosmetics and insecticides is considered in the fifth chapter, but the sixth chapter, which deals with its biological aspects, is probably of wider interest. In this area the authors consider not only the action of synthetic surfactants but also the properties of the naturally occurring phospholipids and bile salts. The discussion is often speculative and, in the case of the solubilization of carcinogens, rather frightening, but the chapter as a whole makes fascinating and stimulating reading.

The last chapter describes chemical reactions in solubilized systems, emulsion polymerization, detergency, and dyeing and other textile processes.

The selection of literature throughout the book is extremely good and will, in my opinion, probably withstand examination by specialists in the diverse fields covered. Integration of basic research with data in the applied fields is also satisfactory and in many cases has given some stimulating chapters with original grouping of the material. These should provide considerable insight for many practitioners in the field as well as for students and others with potential interests in the remarkable and diverse properties of surface-active agents.

B. A. MULLEVY

## EXTRACTION OF METALS

**Advances in Extractive Metallurgy**

(Proceedings of a Symposium organized by the Institution of Mining and Metallurgy and held in London from April 17 to 20, 1967.) Pp. xiv+1023. (Institution of Mining and Metallurgy: London, 1968.) 200s.

PROFESSOR F. W. RICHARDSON, in his 1964 Howe Memorial Lecture, "The Climate of Extractive Metallurgy in the 1960s" (*Trans. Amer. Inst. Min. Engrs.*, 230, 1912; 1964), pointed out that extractive metallurgy has been rather neglected in many universities and colleges throughout the world for some time and that research in extractive metallurgy in industry also has probably not received the attention it warrants. According to him, at that time ten times as much effort was being expended on research on physical metallurgy as on extractive metallurgy. He referred also to this in the seventh Sir Julius Wornher Memorial Lecture, "Growth and Use of Basic Knowledge in Extractive Metallurgy" (*Bull. Instn. Min. Metall.*, No. 727, 5; 1967), which, very appropriately, was presented on the evening preceding the symposium proper.

It seems that a change in the climate may be taking place and that this is reflected in the papers presented at the symposium, which was concerned with "the extraction of metals from ores and residues (the shaping of metals being excluded), with emphasis on research and development associated with new processes and process improvements and new or non-conventional source materials (including secondary materials)".