

ticle by A. E. Ringwood, "The chemical composition and origin of the earth," and the one by Francis Birch, "Earth heat flow measurements in the last decade," are particularly successful in reducing to meaningful dimensions the teeming literature of recent years in these two fields, and it would seem unfair to pass them over without specific compliment.

Users of this expensive, 500-page volume will be disappointed to find that the articles are not provided with abstracts and that the book has no index.

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## British Research Establishments

**The Organization of Research Establishments** (Cambridge University Press, New York, 1965. 281 pp., \$11.50), edited by Sir John Cockcroft, is concerned with research in Great Britain. It draws on a wide range of fields, from agriculture through medicine to chemistry, physics, and engineering. To give perspective to the 11 case histories of British laboratories, two additional contributions are included, one on the Bell Telephone Laboratories by its president, J. B. Fisk, and the other on CERN by its former director general, J. B. Adams.

Sir John Cockcroft makes the following statement at the end of his introduction: "The objective of this book is to discuss the factors which make for creativity and productivity in a wide variety of research establishments. We hope that the varying experiences and ideas put forward will be of value to all those who have the responsibility for research."

The average length of each chapter is 19 pages. Because one must describe in some detail the specific aim and subject area of a laboratory in order to bring home to the reader some observations of a more general nature on the promotion of creativity and productivity, the book, in some places, appears to be more a historical account of British research than a handbook for those who seek an answer to a definite organizational problem in a research laboratory. However, most questions do not have a unique answer, and this approach may be a desirable one that will lead the knowledgeable reader to

draw his own conclusions from the various cases presented. Great Britain and the United States—two countries where the government spends large amounts of money on research—vary greatly with respect to the channels through which the money is spent. In the United States the larger part is given to private industry in the form of contracts, but the fraction expended in this manner is much smaller in Great Britain. This is reflected in the contents of this book. Of 11 contributions on British laboratories, only one describes industrial research in a private organization, the other ten dealing with government establishments or cooperative research associations. (In the latter the control is in the hands of the relevant industry's trade association and the government's financial share usually is quite modest.) For this reason much space in the book is devoted to the pattern of governing bodies and representative committees needed for the proper executive function at the top. The opinion that, to retain its effectiveness, the organization of a laboratory should not transgress a maximum size is clearly dismissed by the contents of this book. On the other hand the well-known "critical mass" effect for a laboratory is apparently a rather "wild" function of the subject area involved.

The story of CERN, the European Organisation for Nuclear Research, contains a number of very worthwhile observations on the reasons for its success. Many of the later cooperative ventures in Europe seem to foster national chauvinism rather than to abate it. Adams writes that "... the danger for CERN lay in the Member States wanting to obtain a share of the contracts and a share of the staff posts in rough proportion to their contributions to the organisation."

The book ends with Sir Edward Bullard's delightful essay "What makes a good research establishment?" Here every director of research will find good counsel and a number of his own experiences, pointedly formulated.

Because the contributors are, without exception, very senior people with extensive experience in the direction of laboratories, the book will be a source of information and inspiration, direct or by comparison, for all those who are responsible for the administration of research.

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## Marine Biology

Only a decade ago there were just a few references and texts on oceanography and a few more on marine biology. In the last few years we have been overcome with a tsunami of books covering every aspect of the marine sciences. Even formerly obscure areas, such as marine planktonology, are becoming as popular as freshman biology.

Planktonology is rather an anomaly today. Organized systematic studies began in the middle of the 19th century. Mostly taxonomic and distributional in nature, this work existed for its own sake first, and then later as a handmaiden of fishery biology. However, during the past 25 years, there has been a steadily growing interest in the ecology, physiology, and biochemistry of this miscellaneous assemblage of plants, animals, and in-betweens, which are so obviously related to each other and are so important to the marine economy. Today we have an enormous body of long-standing, well-organized, detailed, and extensive knowledge of "what" and "where," and another, largely unrelated but enormous body of recent, disorganized, conflicting, patchy, and intensive knowledge of "how" and "why."

The latest contribution attempting to combine and relate the old and the new work in some rational, general framework, is R. S. Wimpenny's **The Plankton of the Sea** (Elsevier, New York, 1966. 426 pp., \$16). It is not completely successful.

The author's expressed purpose was to write a popular book, but, as other similar books appeared, Wimpenny shifted his orientation toward students and beginning professionals while attempting to retain a basic usefulness for the educated layman. The resulting unevenness is evident both in details and in the overall plan.

The book consists of 12 chapters, a glossary, a bibliography, figures of organisms, and an index. The style is conversational, informal, and occasionally witty. There are text figures but not nearly enough. This is a major weakness of the book. The author relies on long, complicated verbal explanations when a picture would have been sufficient or would have helped the explication.

One example, and perhaps the worst, is his discussion of the light and dark bottle method using either gas exchange or carbon-14. The explanation