ticular country in working out a pattern and solution appropriate to its own needs and conditions. Forms of co-operation even may differ, and while in the United States, for example, sponsored research institutes are already well established and the co-operative research association finds no favour, the situation varies considerably in Europe, where the field for sponsored research institutes depends on the extent and efficiency with which industry and government meet the requirements for research. No wholly satisfactory solution to the research needs of the small firm has yet been found; but on the other hand, the factors responsible for a satisfactory research climate are well understood and valid generally. The reports of these Technical Assistance Missions are well calculated to dispel any complacency engendered by that submitted to the Commonwealth Scientific Conference. Even in regard to documentation and the communication of results, they call for a critical review of existing methods and for active attempts to improve the means of communicating research results to industry; and the research worker himself is summoned to take part in this work. In particular, he is urged to examine the form in which information is supplied to him and, where appropriate, to indicate and press for better means. No scientist who reads the reports of these Missions is left in any doubt as to the importance of the contribution which he has to make, both personally and through his professional associations, to the constructive thinking and critical scrutiny of our whole organization for scientific and industrial research and for the means of disseminating the results of its activities. That thinking and scrutiny must precede alike the formulation of an adequate national research policy, and the devising of appropriate measures both to foster a real research climate and to overcome the obstacles, whether fiscal, psychological or technical, which hinder technological innovation in industry.

ANALYSES OF MARINE ORGANISMS

The Elementary Chemical Composition of Marine Organisms

By A. P. Vinogradov. (Memoir No. 2.) (Translated from the Russian by Julia Efron and Jane K. Setlow, with Bibliography by Virginia W. Odum.) Pp. xiv + 647. (New Haven, Conn.: Sears Foundation for Marine Research, Yale University, 1953.) 17 dollars.

THOUGH less than one-half per cent of the organisms that live in the sea have been submitted to any kind of elementary chemical analysis, much has been done. Analyses have become buried in a mountain range of journals, many highly inaccessible. There has been no means by which a research worker in a reasonable time could find what has been done in his own field. Full assessment of the part played by marine organisms in geochemistry has been impossible.

As part of the programme of Prof. V. I. Vernadsky's Biogeochemical Laboratory of the Academy of Sciences, Moscow, Prof. A. P. Vinogradov undertook the exceedingly onerous task of collecting and assessing this literature. He has published the results in the *Travaux* of that Laboratory in three parts in 1935, 1937 and 1944. These included much fresh and accurate analytical work from Russian laboratories by Vernadsky, Vinogradov and their school. Of these Russian publications, very few copies are available to the Western world. The reviewer knows of no accessible copy of the 1944 part in the British Isles.

The translation of this unique work into the English language has resulted from a happy Russo-American collaboration under the ægis of the American Museum of Natural History and the Sears Foundation of Marine Research. It is not a word-by-word translation by hacks but really a new work. The additions of the 1944 part were incorporated as appropriate in the earlier parts. The whole English translation was then seen by Vinogradov, who added new and unpublished material and made corrections. Still more recent material was added during editing and preparation for the press. There are also many helpful footnote commentaries by the translators. The bibliography of about 2,500 entries is essentially new and adds greatly to the value of the work for the advancement of geochemistry, marine biochemistry and systematics, oceanography, as well as of industrial biology and the science of petroleum.

One chapter is devoted to each phylum and may occupy 100 pages or less than one. For phyla much investigated such as algae, molluscs and fishes, the chapters are broken down into sections dealing either with single chemical elements or with single families. Owing to the difficulty of removing extraneous salt from the marine organism there has been much confusion in the meaning of such basic terms as 'wet weight'. Vinogradov has made order out of chaos, and future analysts of marine organisms would be wise to model their procedure to fit his classification.

The language of such a compilation is always likely to be repetitive, stilted and dull. In fact, this work is none of these, but has literary merit and holds attention by well-marshalled presentation and attractive writing. The technical production is superb and, in a book which will long retain scientific value, may be justified. However, in spite of heavy subsidy from the American Museum of Natural History and the Sears Foundation of Marine Research and the financial advantages of printing in Denmark, its price is so high as to place it beyond the means of most individuals outside the United States. Many would forgo the pleasure of consulting a collector's piece in a wealthy library for the advantage of themselves possessing a shoddier edition of an essential working tool. The cost of essential books which should be in a research worker's personal library is ever rising. Is there a case for again pressing on the Board of Inland Revenue, perhaps in the debates on the Finance Bill, the view that such costs are properly chargeable as personal expenses against taxation?

This book is as complete as any work of man is ever likely to be, but it cannot remain so. In a few years supplements will be needed, perhaps to the 327 tables with their numbers unchanged. It is to be hoped that the Biogeochemical Laboratory of the Russian Academy of Sciences, the American Museum of Natural History and the Sears Foundation may be able to achieve the preparation and publication in Russian and English of such supplements.

L. H. N. Cooper