

vantage of being both attractive in format and taut and logical in its presentation of the subject.

The introductory chapter is about preservation and fossilization, with general comments on ecology and taxonomy. The second chapter, on ecological factor of fossil distribution, is well done. There is a particularly elegant discussion of biocoenoses and thanatocoenoses which is not surpassed elsewhere, and is appropriate from the pen of the editor in chief of the International Association of Sedimentologists. The chapters on geographical factors of distribution and on stratigraphical palaeontology are readable but necessarily condensed. The final chapter on aspects of evolution owes a great deal to Simpson and Newell, but throughout this and other chapters the author has refreshingly put a stamp of his own. Throughout the book the illustrations are of high quality.

Minor errors include the inversion and reversal of text Fig. 16 and incorrect magnification to text Fig. 56. Text Fig. 46 is attributed to Moore, but seems originally based on a figure by Whittington in *Status of Paleontology 1954*. Since 1959, of course, rapid strides have been taken in palaeontology, particularly in the fields of geochemistry and the use of radioisotopes: this edition would have been improved by being brought more up to date in these and other fields. The price of 35s. for a paperback edition is staggeringly great, and it would be disappointing if for this reason it is not widely used by students.

M. R. HOUSE

DIGGING UP OIL

Geology of Petroleum

By A. I. Levorsen. Second edition, revised and edited by Frederick A. F. Berry. (A Series of Books in Geology.) Pp. x + 724. (San Francisco and London: W. H. Freeman and Company Ltd., 1967.) 100s.

THERE is an increasing demand for petroleum today in a world which is almost dominated by the internal combustion engine. The intensive exploration that was carried out by the major oil companies after the War has provided reserves sufficient to take care of supplies for the next thirty years. With requirements doubling every twenty years, however, exploration for new sources of oil must continue. Fortunately, experience shows that oil occurs much more commonly than was believed fifty years ago. In the early days, when drilling depths were limited to a few thousand feet and when the main targets for economic oil deposits were indicated by surface seepages, the oil reserves of the world appeared to be very limited in size. Now that drilling to several miles below surface is an everyday matter and geophysical methods can locate deep potential oil-bearing structures, the horizons for oil discovery have vastly increased.

Oil geology is a specialized branch of normal geological thinking, in that generally it is only the thick sedimentary rock strata that are of importance. Furthermore, oil is contained in porous rock, and oil geology is therefore concerned with the movement of fluids, both liquid and gas, through the fissures and pores of limestones and sandstones. There is therefore a requirement for a geological textbook which caters for the oil geologist. The late A. I. Levorsen has supplied this need most admirably since 1954.

The second edition of Levorsen's *Geology of Petroleum* has been completed in its revision by Dr Frederick A. F. Berry, for Levorsen died before finalizing editorial changes in the manuscript of the second edition. The result is what might be expected from these two capable and experienced exponents of petroleum geology, and the second edition will go forward for another decade as the accepted main work on the subject.

The new edition includes a section dealing with the work on the effect of moving underground water on the shape of oil-water interfaces, a facet of reservoir engineering that has been understood only comparatively recently. The tilting of a water seal has a profound effect on the distribution of oil and gas in petroleum traps.

Arguments about the origin of oil still continue, and the chapter on this subject has been completely rewritten. Not only does it include the cases for inorganic, marine, freshwater and other origins, but it also gives a reasoned opinion which is favoured by the majority at the present time.

The book is thoroughly well illustrated with examples of all types of petroleum reservoirs, and contains many tables describing properties of typical crude oils and gases. It is therefore suitable for the reservoir engineer and the production man as well as for the exploration geologist and geophysicist, and it is written in a style clear enough to provide a useful reference source to those who are interested in the oil industry but have not enjoyed the good fortune of having a scientific training.

T. F. GASKELL

THIS IS TUNGSTEN

Tungsten and its Compounds

By G. D. Rieck. Pp. ix + 138. (Oxford, London and New York: Pergamon Press, Ltd., 1967.) 45s. net.

TUNGSTEN is the third member of Group VIA of the periodic table and the fourth member of the third transition series. Until recently much of the chemistry of tungsten and its compounds was obscure. In the past fifteen years our understanding of the chemistry of individual transition elements, especially the early transition elements, has advanced, mainly as a result of intense interest in co-ordination compounds. Characteristic compounds of tungsten and neighbouring elements include mononuclear and polynuclear oxo-complexes of the higher oxidation states; for example, $[\text{WOCl}_2]^{2-}$. These are of theoretical interest because of the presence of multiple metal-oxygen bonds; carbonyls, substituted carbonyls and related organometallic complexes of the low and negative oxidation states, which have been important in the development of theories of bonding in this type of compound; compounds containing metal-metal bonds and metal atom clusters, for example W_6Cl_{12} ; and compounds in which the metal has a co-ordination number greater than six, such as the octacyano complexes of molybdenum, tungsten and rhenium. Understanding of the metal-ligand bonding interaction has developed with the aid of detailed studies of the chemical, magnetic and spectroscopic properties of the complexes and determination of representative structures by X-ray crystallography. Research in transition metal chemistry has, however, been orientated towards compounds of the same type formed by a number of metals rather than towards individual metals; the publication of monographs and review articles on individual transition metals is therefore welcome.

Dr. Rieck's monograph, according to the introduction, is "mainly concerned with recent developments and physical, chemical and metallurgical data about tungsten and its compounds" and is "written principally for chemists, physicists, or metallurgists". The bias of the book, however, is metallurgical, and chemists who expect on the basis of the title an up-to-date survey of tungsten chemistry will be disappointed. For "theoretical considerations" the author refers the reader to textbooks of inorganic and physical chemistry.

This book is divided into three chapters. The five pages of Chapter 1 deal with the history and applications of tungsten and with tungsten ores. Chapter 2 is a detailed account of the physical, chemical and metallographic