

His last words are that: "The findings of geology are in complete agreement with modern biological views on an origin of life on earth through natural causes. Although, of course, such an agreement offers no proof that the newer biological theories are correct, at least it offers us a most pleasant ending to our studies into one of the most intriguing problems of present-day science".

This pithy book gives us a welcome fresh light on one of the most exciting problems of the day, and account will certainly have to be taken of its findings in any future discussions of the origin of life.

J. D. BERNAL

Nagy, B., Meinschein, W. G., and Hennessy, D. J., *Ann. N.Y. Acad. Sci.*, 93, 25 (1961).

WERNER'S MINERALOGY

On the External Characters of Minerals

By A. G. Werner. Translated by Albert V. Carozzi. Pp. xxix+118. (Urbana: University of Illinois Press, 1962.) 4.50 dollars.

ABRAMHAM GOTTLÖB WERNER was an outstanding figure in the geological world during the last quarter of the eighteenth century and the early years of the nineteenth century, the period that saw the rise of modern geology and mineralogy. From 1775 until his death in 1817 he taught mineralogy and mining geology at the School of Mines at Freiberg, in Saxony. Here his inspiring lectures and attractive personality built up a school of mining and geology that drew students from all over Europe. His fame rests not so much on his contributions to mineralogy and geology, which, for the most part, have not stood the test of time, as on the interest and enthusiasm that he aroused in his students, at a time when these subjects were beginning to emerge as separate and definite sciences. Many who attended his lectures afterwards made contributions to geological and mineralogical science of more permanent value than the doctrines taught at Freiberg.

Shortly before Werner commenced lecturing at the School of Mines he had published his *Von der wasserlichen kennzeichen der fossilien* (Leipzig, 1774). *On the External Characters of Minerals* is a new translation of this book which is, essentially, a determinative mineralogy. In it the author advocates the recognition of mineral species by careful and systematic examination of all their external characteristics. Werner realized that any mineral system must ultimately be based on chemical composition; but he was writing for practical mining engineers and miners to whom chemical analyses were not readily available, and at a time when the instrumental aids now taken for granted had not yet come into use. In its time, therefore, the book was one of great importance, as a serious attempt to bring some sort of order into a subject in which, previously, much confusion had existed.

Apart from the fact that earlier editions of the book are not easily obtainable, this new translation is of particular interest because it has been made from Werner's personal, annotated copy of the original edition. This was recently acquired by the library of the University of Illinois, where the translator, A. V. Carozzi, is professor of geology. Prof. Carozzi has established that the extensive annotations, alterations and additions are in Werner's handwriting; and he suggests that they were made with the intention of publishing a second edition which,

in fact, never appeared. Internal evidence indicates the alterations were made over a considerable period of years. The actual translation presented here incorporates these alterations and is, therefore, virtually a second, revised edition of the original work. From a historical point of view this seems regrettable, because all the several earlier translations into English or French incorporated modifications based on notes made by Werner's students, and we are still without a translation of the original text. Prof. Carozzi states that his intention was to publish such a translation, but that editorial and printing difficulties that arose from the attempt to include Werner's alterations in footnotes made it impracticable. He has, however, annotated the text, and added an interesting biographical and bibliographical introduction. The book is a valuable addition to the series of historically important scientific texts and translations published by the University of Illinois in recent years.

V. A. EYLES

WORLD MORPHOLOGY

The Morphology of the Earth

A Study and Synthesis of World Scenery. By Prof. Lester C. King. Pp. xii+699+14 plates. (Edinburgh and London: Oliver and Boyd, Ltd., 1962.) 84s. net.

THIS important and attractive book is characterized by the author as an inquiry to find order, system and, if possible, explanation amid the major topographical features of the Earth. It is a synthesis comparable, though not identical in scope, with Suess's *The Face of the Earth* or Umbgrove's *The Pulse of the Earth*. It is not chiefly or even largely concerned with land sculpture, in the ordinary sense. There are many side references throughout to geophysical and petrological topics, though one regrets the absence of reference to Jeffrey's great work, *The Earth*. The book begins with a brief summary of the structure of the crust—the evidence of seismology, isostasy, radiothermal energy, etc., and it comes quickly to an affirmative position in respect to continental drift and sub-crustal convection. In an interesting and significant section on "Some Dead Wood", the author dismisses the classic theory of a cooling and shrinking Earth and the supposed "crustal shortening". He also dismisses permanence of continental and ocean basins and regards the present concept of sialic roots to mountain ranges as over-simplified.

He then in succession examines the unity of Gondwanaland and its fragmentation, continental structure (shields, mobile welts, etc.). In the second part of the book there is a clear summary of Prof. King's own distinctive and valuable views on pediplanation, slope formation and the "ages of land surfaces". There follows a long chapter on the geomorphology of Africa, with shorter accounts of the rest of Gondwanaland, North America, Europe and Asia.

The Palaeozoic, Neozoic and modern mountain ranges and the ocean basins are then reviewed.

In a last summary chapter, "Towards a Model of the Earth", emphasis is laid on the role of occluded volatiles in the mechanism of earth-movement. The book is clearly written, tautly organized and well illustrated. It is not necessary to agree with all the author's speculations and conclusions to find it stimulating and indeed exciting. There can be no doubt that it attains the status of an indispensable major work.

S. W. WOOLDRIDGE