

It is certainly not the intention of the reviewer to assail—with these remarks—the great value of Ager's well-written book. The examples show, as previously stated, that review books of this nature at present contain parts which are based only on literature studies, with the inherent risk that oversimplifications and misinterpretations find their way more easily into these books than previously and through them may obtain wide distribution and long life. Consequently, geologists should be increasingly critical in accepting statements found in literature before applying them to their own observations; and teachers of geology will do well if they thoroughly stimulate the development of a critical attitude with their students.

Another aspect which seems to go together with the rapid expansion of a particular scientific field is to restrict reading of professional literature to that which is easiest accessible rather than that which is most important. Consequently, one finds that a growing number of English-speaking scientific authors have a tendency to read, almost exclusively, publications in their own language. Although not as striking as with several other authors, this tendency can also be found with Ager. Just over 80% of the publications listed in the bibliography of the book under review were issued in the English language. This shows how the author has, to a major extent, based his book on English paleoecological literature; 11% of the publications listed are in German, one-third of which are papers by H. Richter; publications in French comprise just over 4% of the list; and all other languages make up the remainder (about 4%) of which Russian publications constitute approximately half.

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Problems in Palaeoclimatology. A. E. M. NAIRN (Editor). Interscience, New York, N.Y., 1963, 705 pp., £ 7.7.0.

This book, containing the proceedings of the NATO Palaeoclimates Institute held at the University of Newcastle upon Tyne, January 7–12, 1963, comprises no less than 54 contributions, divided over thirteen chapters. The nature of the papers varies from strictly local studies to studies of world-wide interest. It will be clear that only a—naturally subjective—selection from the contents of the volume can be mentioned here.

The introduction ("The Third Confrontation") by the late W. H. Bucher is most worthy of being read. He points out that geophysicists should not feel impatient with those geologists who do not simply re-orient their thinking to accept all that which seems inescapable to geomagnetists, but firstly consider it their duty to search systematically and world-wide in the geological record for observations on floras, faunas and sediments that provide unambiguous, decisive geological proof concerning the geophysical conclusions. The present confrontation of opposing views challenges both sides, and both should withhold judgment until the riddle is solved.

The next chapter, the use of fossil plants in palaeoclimatic interpretations, is dominated by a valuable historic-methodological contribution by E. Dorf under the same title. Barghoom demonstrates how statistical, or at least semi-quantitative, methods can be applied in the study of fossil floras.

Chapter 3 deals with evidence of climate from coal and coal measures; chapter 4 with the recognition of ancient glaciations. In chapter 5, on Precambrian glaciation, W. B. Harland gives an extensive review of the evidence for a Late Precambrian glaciation, which is remarkably widespread. It suggests that the Precambrian tillites provide a means of breaking through the stratigraphic barrier at the base of the Cambrian, by a combined palaeoclimatic, palaeomagnetic and radiometric approach. M. J. S. Rudwick presents the idea that the radical climatic and ecological changes following the Late Precambrian glaciation provided an adequate "trigger mechanism" for the unparalleled rate of evolution which followed, leading to the appearance of the Cambrian fauna.

Geophysical techniques and ancient climate is the subject of chapter 6, which opens with a clear explanation by S. K. Runcorn on the connexion between palaeomagnetism and palaeoclimates, followed by J. C. Briden and E. Irving's palaeolatitude reconstructions with aid of sedimentary palaeoclimatic indicators. Chapters 7 and 11 deal with the climate of the Devonian and Permian period respectively, both showing contents of a diverse nature.

It is not without reason that chapter 8, on theoretical considerations and Quaternary climates, opens with a contribution by E. A. Bernard on the laws of physical palaeoclimatology, which can best be understood by extending the complex laws of physical climatology back into geological time. Interpretation of the multiple observational palaeoclimatic data should never transgress the general and permanent laws of physical palaeoclimatology. H. H. Lamb studied the more or less world-wide cold epoch, 1550–1850, sometimes called the Little Ice Age. He establishes some methods applicable to a variety of epochs and produces results which are firm, and yet usefully indicate margins of error, regarding one climatic fluctuation on a time-scale that seems to occur within ice ages (some interstadials and some cold fluctuations in interglacial periods) and also other geological epochs. The fourth of the six papers, which comprises chapter 8 (inadvertently referred to by the Editor on p.306 as the final paper) is by M. Ewing, and presents

a concise review of oceanographic data recording Pleistocene glaciation. Based on a study of fossil Quaternary dunes in Africa, Fairbridge draws the notable conclusion that there is reason to relate ancient desert dunes to cold rather than warm epochs in the past.

The ninth chapter, on the recognition of arid climates and wind direction studies, is again one of a rather heterogeneous content with a load of local material. Still more important is chapter 10 on carbonates and evaporites. In an extensive article R. W. Fairbridge presents the working hypothesis that the earth's history may have evolved through several geochemical revolutions, each of which may have had far-reaching effects upon CaCO_3 -deposition. These revolutions are, at least in part, the result of metabolic evolution and are thus, at the same time, both results and potentially causes of further organic differentiation. The Ca/Mg ratio in carbonates is related to temperature. What is now most of all needed is a world-wide study of carbonate deposits. In the second contribution to this chapter, O. Braitsch points out that the only safe basis for temperature estimation of evaporite formation is that founded upon physical chemistry. Those who are familiar with F. Lotze's book *Steinsalz und Kalisalze* will find the essentials of this in his paper on the distribution of evaporites in space and time, in the volume under review; the illustrations on the position of the evaporite zone during successive periods in the earth's history are most valuable and worthy of finding their way into general geological handbooks. Various cycles, which can be discerned in varvitic evaporites, are described by G. Richter-Bernburg in the final paper of this chapter.

In chapter 12, biological and palaeontological information is assembled in order to study the relationships between animal life and climate. The opening paper by G. Y. Craig on marine invertebrate ecology and palaeoecology is composed rather casually. J. Wyatt Durham emphasizes that we generally have an imperfect record of a fauna potentially available at a particular site, because of both the "survival ability" of the organic remains themselves and of inadequate sampling and study of what has actually been preserved. C. Teichert warns, amongst other things, against circular reasoning by interpreting climates in terms of fossils and vice versa.

A. G. Fischer investigated the rhythmic growth patterns which are found in Silurian tabulate corals, and which Ma, in a similar way as is done with tree-rings, had previously used as a basis for palaeoclimatologic and palaeogeographic reconstructions. It is shown that the data at present available are still insufficient to lead to reliable conclusions. In the discussion, Durham pointed out that growth patterns in other organisms do not always seem to be related to climate, and Lowenstam said that of the modern corals growing off Bermuda, those growing offshore seem to show no rhythmic growth, whereas those from the restricted inshore environment do show such a rhythmic growth banding. In the next contribution, E. H. Colbert presents a survey of vertebrate-palaeontological data of value in the study of past climates.

The last chapter is devoted to problems of sediments and soils. F. B. Van Houten's paper on some red-bed problems is a continuation to his contribution in *Descriptive Palaeoclimatology* on the climatic significance of red beds. There are two pedological contributions. C. Bloomfield shows that, in contrast to current belief, iron in soils is very readily mobilized but, under oxidizing conditions, ferric oxide reprecipitates easily and this obscures the behaviour of iron in the field. E. le Borgne describes how measurements of the magnetic susceptibility of recent or ancient soils (which is generally much greater than that of the underlying parent rock) can provide information on the history of the soil.

Summarizing, the book contains a wealth of information for any of the readers of this journal. Each chapter opens with a general introduction by the Editor, which is especially useful since most of the papers lack a summary. In the genuine intention to serve readers by interrupting the chapters as little as possible, the bibliographies are assembled at the end of each chapter. In practice, however, this was found rather unpractical and through the general great divergency between the successive papers, for a volume like the present it neither led to the desired result.

It is questionable as to whether it has been wise to link an international scientific conference of this kind to a military alliance. On the other hand, it is now interesting to look for a counter-move to this challenge from e.g., S.E.A.T.O., the Warsaw-pact countries or the group of non-allied countries, since, after all, competition in this way is much to be preferred over that of a force of arms.

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Microfaunes et Microfacies du Permo-Carbonifère du Sud Tunisien. CH. GLINTZ-BOECKEL et J. RABATÉ. Brill, Leiden, 1964, 263 pp., Dfl. 85,00.

Only a few papers have, so far, been published about the Upper Palaeozoic of Tunisia, but those which appeared, mentioned the presence of generally fossiliferous deposits, mainly of Permian age.

The book by Glintzboeckel and Rabaté gives a short review of the microfauna and microfacies of the Permo-Carboniferous in the south of Tunisia (18 pp. of text in French, with a summary of approximately 3 pp. in French, English and German). They distinguish three provinces: (1) The Upper Permian of the Djebel Tebaga, in the area of Medenine, where a thick shale formation is found that has been laid down in a rapidly subsiding basin. (2) The reef facies of the Upper Permian in the Bir Soltana area, southwest of the Djebel Tebaga. (3) The Permo-Carboniferous in the marginal Gefara (Namurian, Moscovian, Upper Carboniferous, Lower Permian, doubtful Middle Permian, Upper Permian), mainly represented by limestones.