

SÓBOLEV (V. S.), Editor. *The facies of metamorphism*. Transl. from the Russian by D. A. Brown. Canberra (Australian National Univ. Press), 1972. iv + 416 pp., 112 figs. Price \$A6.50.

This interesting work is a translation of the first book in a five-volume monographic review of metamorphism originally published by the 'Nedra' Publishing House of Moscow in 1970. In the present volume there are three parts, dealing respectively with Experimental data as evidence of metamorphic conditions, Metamorphic conditions in nature and the facies principle, and Material composition of metamorphic rocks. Information is drawn from a wide spectrum of materials and sources and many previously unpublished Russian data are here made available. The authors have critically analysed and collated the vast literature on metamorphism but emphasize that the monograph is based in the first instance on their own experimental work and their own personal views. A number of theoretical problems have been treated in a new way, including the role of H₂O and CO₂ during metamorphism and the dependence of subsolidus reactions on pressure. A statistical treatment is presented for the more important metamorphic rock-forming minerals (garnets, pyroxenes, amphiboles, biotites, chlorites, and epidotes): for each of these minerals, the average composition of the main paragenetic types is tabulated and shown diagrammatically. A historical survey of the development of the facies principle is given by N. L. Dobretsov, and a new facies scheme is presented, the most important feature of which is claimed to be the clearer recognition of facies not only in regard to temperature but also pressure. There is a distinct separation of high-pressure facies and, as far as possible, a sharp definition of boundaries and content of facies with the aid of important univariant equilibria (with mutually exclusive associations on different sides of the reaction line). Thus the authors have attempted to escape from many of the deficiencies of existing schemes, though undoubtedly as new experimental and analytical data become available this scheme will be modified and improved. Several changes in facies terminology are proposed: it is suggested that the name sanidinite facies be dropped in favour of spurrite-merwinite facies and that there should be a more precise nomenclature for the facies of contact metamorphism. Names are introduced for medium- and high-temperature facies based on metapelite parageneses, which in respect of facies of medium pressure are used on a par with the old names. In part three the geochemical conditions of metamorphism and the problems associated with metasomatism are considered in some detail. The relative role of metasomatism under different conditions of temperature and pressure and the relative mobility of various components during metasomatism under different conditions are critically discussed. There are some 1100 references but, alas, no index.

The translator benefited from close co-operation with the Russian authors and was able to incorporate a number of amendments and corrections. The final product is an internationally important text that deserves a wide welcome and which will take its place along with earlier works by Barth, Correns, and Eskola, by Turner and Verhoogen, by Fyfe, Turner, and Verhoogen, and by Korzhinskiĭ, each milestones on the road to a fuller understanding of some aspects of metamorphism. Further mono-

graphs are promised on contact metamorphic facies at low pressures, and on regional metamorphic facies at moderate and at high pressures. R. A. HOWE

DOWNIE (C.) and WILKINSON (P.). *The geology of Kilimanjaro*. Sheffield (Dept. of Geology, University of Sheffield), 1972. x + 253 pp., 44 figs., 11 pls., coloured geol. map (1:125 000). Price (post-free including map), £6.00.

This detailed account of the geology of one of the largest and most striking volcanological features in Africa will be welcomed by workers in many fields. The book is very comprehensive and deals with all the important facets of the geology. After a brief introduction and a summary of previous geological work on Kilimanjaro, two chapters are devoted to a description of the geomorphology, glaciology, and glacial history. This includes detailed maps of the present and former distribution of the ice, with comments on how the glacial history might correlate with that of Mt. Kenya. The geology of the three major volcanic centres Shira, Kibo, and Mawenzi is then described. A large amount of detailed information is given, including an account of the geological history of each centre, the nature of the major and minor intrusions, and, in some cases, flow by flow descriptions of the lava stratigraphy.

The concluding chapter, of sixty pages, deals with the petrography and petrology of the rocks. It includes a tabulated information on major and some trace-element data on eighty-four Kilimanjaro rocks; about half of the major-element and all the trace-element data are new and have not appeared elsewhere in print. This informative section is, in the opinion of the reviewer, unfortunately marred by the adoption of a very rigid scheme of nomenclature based on the normative compositions of the rocks. The well-accepted terms 'mugearite' and 'hawaiite' are rejected as 'these names are petrogenetically loaded' (p. 192) and 'trachyandesite' and 'trachybasalt' used instead. Many of the more salic rocks are termed 'latites' and 'nepheline latites' and the use of both of these terms to describe rocks from this very alkaline volcano seems most unfortunate. The petrology and geochemistry of the major centres is considered in turn, and in particular an attempt is made to assess the significance of volatile transport in the genesis of the Kibo rocks. It is perhaps unfortunate that comparisons with other Rift Valley sites, and in particular Mt. Kenya, are brief or have not been included. The detailed account of the Mt. Suswa phonolites by Nash *et al.* (1969) is not even listed among the references, nor are comparisons made with the 'plateau' phonolites of the Kenya Rift. Nevertheless, Mr. Wilkinson's chapter provides a sound geochemical basis for further work on the petrology of the Kilimanjaro rocks.

The book is accompanied by a colour-printed geological map of Kilimanjaro on the scale of 1:125 000. This has been carefully prepared and printed and many of the more striking volcanological features are apparent. The map forms a very useful appendix to the account that will be welcomed by not only the volcanologists, but also by other scientists working in the area. I. L. GIBSON