

All in all, I found this a stimulating book that forced me to question the conventional approach to the subject. If I remain convinced that the conventional approach is better, I have nonetheless profited by studying Pitty's book. I hope that this will not be his last book, for he has a stimulating way of looking at geomorphology. I hope he can withstand criticism by stodgy persons such as this reviewer and, hopefully with a bit more disciplined organization, produce further contributions to the science.

A. L. BLOOM

The Facies of Contact Metamorphism; by V. V. REVERDATTO, edited by V. S. SÓBOLEV, translated by D. A. BROWN. P. vii, 263, 49 figs., 5 tables, Canberra, 1973 (Australian Natl. Univ. Press, Dept. Geology Pub. 233, \$7.50).—This is a translation of a Russian book published in 1970 by Nedra Press, Moscow—the second of a projected five volume series on metamorphic facies. Primarily, it is an exhaustive and informative world-wide review of the petrology of well-documented field occurrences of contact metamorphic rocks, with much more data on Soviet localities than could possibly appear in a comparable work written in the west. Secondly, it represents an attempt to reclassify the accepted low pressure metamorphic facies according to modern ideas about mineral stabilities. Considering how incomplete our quantitative knowledge of such stabilities still is, and that most references cited in the book are pre-1968, it is perhaps inevitable that this attempt should be less than a complete success. As the author states in his introduction, he is not a member of the "Korzhinskii school" of metasomatism, thermodynamics, and graphical analysis; rather, he is at his best describing the high temperature isochemical contact metamorphism of carbonate rocks, his specialty.

As might be expected, the translation contains many typographical and other errors not present in the original, such as the confusing substitution of "dubiously" for "indubitably" or "undoubtedly" on p. 10, the fact that p. 46 should go between p. 43 and 44, and (just to prove that I read the whole book) the repetition of two lines from p. 243 on p. 244. These errors are minor, and to make up for them the translator has added greatly to the value of the bibliography by adding page numbers to all the journal references—something that Russian authors never seem to do. Addition of an index of localities discussed might have been even more helpful.

The introductory chapter contains a rather uninformative discussion of temperature gradients in contact metamorphic aureoles, the kinetics of recrystallization, and the relative roles of CO_2 and H_2O in metamorphism. Succeeding chapters deal with various metamorphic facies in order of decreasing temperature. Thus the second chapter, probably the best in the book, considers the "spurrinite-merwinite facies", a term chosen by the author to replace "sanidinite facies" because, as he

argues, the transition from sanidine to orthoclase is a kinetic one and depends on the rate of cooling, rather than the absolute temperature. All of those favorite calc-silicate minerals are mentioned—larnite, merwinite, rankinite, spurrite, tilleyite, et cetera, and a remarkably complete review of their occurrences is given. To my knowledge, the author missed only two occurrences—first, a spurrite-monticellite-calcite rock with accessory vesuvianite and spinel from the Zimapan mining district, Hidalgo, Mexico (Simons and Mapes, 1956, U.S. Geol. Survey Prof. Paper 284, p. 41-42) and second, the recent Hirata and Uenotani finds of spurrite, gehlenite, and other minerals from near Kushiro, Hiroshima Prefecture, Japan (Henmi and others, 1971, Chem. Abs. 76-27066; and Kusachi and others, 1971, Chem. Abs. 76-27067).

The third chapter considers the “pyroxene hornfels” facies, which the author subdivides into a “monticellite-melilite” subfacies at relatively high temperatures and a “grossularite” subfacies at somewhat lower temperature, both lying within the stability fields of periclase and wollastonite. As in Chapter II, the discussion of facies classification for non-carbonate rocks is somewhat confused.

The fourth chapter deals with the “amphibole hornfels” facies, which the author regards as lying outside the stability field of muscovite plus quartz. Chapter V therefore introduces a “muscovite hornfels” facies, for which muscovite plus quartz is stable. These terms are used respectively in place of the older terms “hornblende hornfels”, because hornblende is not the only amphibole, and “albite-epidote hornfels”, because albite and epidote are regarded as metasomatic in many of their occurrences. In my opinion, the present need for any of these changes in terminology is debatable, inasmuch as most modern petrologists appear content to infer the conditions of metamorphism directly from applicable experimental and thermochemical data, without reference to any particular facies scheme.

The book concludes with a sixth chapter that briefly and incompletely considers the thermal stabilities of minerals that occur in skarns and hydrothermal alteration assemblages. This chapter lacks the excellent reviews of field occurrences found in previous chapters and could well have been omitted.

Despite its numerous faults, the book succeeds simply because it provides a careful and concise summary of field occurrences. It is possibly the best such summary since the first part of Harker's *Metamorphism* (1939), although it lacks that book's invaluable illustrations of thin sections. Its discussion of facies, while admittedly argumentative and already out-of-date, probably is no worse than what one finds in comparable textbooks recently published in the west.

D. M. BURT