

BOOK REVIEWS

LIPPMANN (F.). *Sedimentary carbonate minerals*. Berlin, Heidelberg, and New York (Springer-Verlag), 1973. vi+228 pp., 54 figs. 29 tables. Price DM 58.

Dr. Friedrich Lippmann of the University of Tübingen is well known for his experimental work on the chemical and mineralogical aspects of the low-temperature formation of carbonate minerals; especially dolomite $\text{CaMg}(\text{CO}_3)_2$ and norsethite $\text{BaMg}(\text{CO}_3)_2$. It is, therefore, not surprising that this book, one of a series of monographs on theoretical and experimental studies, concentrates on those aspects of the carbonate minerals that are related to the crystal chemistry, crystal structure, and chemistry of formation of these minerals. The natural occurrence of these minerals and their petrographic relationships falls outside the scope of this monograph and therefore receives only passing mention.

The monograph is divided into five sections of varied length.

The first section (4 pages) or introduction, deals with the role of mineralogy in the petrology of sedimentary carbonates, and explains why with the abundance of books on carbonate petrography this aspect is not included, and why in spite of their abundance the iron carbonates receive little attention.

The second section (87 pages) covers the crystal chemistry of the sedimentary minerals in a very thorough manner. Starting with a short history of research it goes on to cover the crystal structures of calcite, dolomite, and aragonite, together with their respective isotypes, in great detail. The section ends with an investigation of the problems of magnesian calcites, calcian dolomites, cation hydration, and the dehydration barrier.

The third section (49 pages) deals with the relationship between the two most abundant polymorphs of calcium carbonate, namely calcite and aragonite. The theoretical and experimental stability of these and other carbonates under temperature and pressure conditions similar to those found at the Earth's surface is discussed first. This is followed by a consideration of the apparently anomalous formation of aragonite in both the presence and absence of other bivalent cations. The chemical and mineralogical significance of the formation of aragonite in ooids and the shells of organisms is considered and the section ends with a sub-section on the persistence of aragonite and its transformation to calcite.

The dolomite problem and a number of suggested solutions make up the fourth section (43 pages). After dealing with the stability of dolomite and magnesian calcite in anhydrous and hydrous conditions, as established by theoretical and experimental studies, the author goes on to discuss 'norsethitzation' and its bearing on 'dolomitization' in some detail. One short sub-section in this part of the book underlines what may be considered as an underlying weakness of the application of this approach to the study of minerals. Petrographic studies undertaken in Russia, France, and the United Kingdom have all advanced good evidence for the existence of rhomb-shaped calcite crystals that are pseudomorphs after dolomite. However, as the kinetic and

thermodynamic conditions are difficult to imagine, the process is dismissed by experimentalists as unlikely to be important in nature.

The final section (5 pages) is a summary of the third and fourth sections applied to freshwater and marine limestones and the process of dolomitization.

This book is an important addition to the library of all students of carbonate rocks, to be used, as Dr. Lippmann suggests, in conjunction with the already existing works on carbonate petrography.

P. BUSH

STRAND (T.) and KULLING (O.). *Scandinavian Caledonides*. New York and London (Wiley-Interscience), 1972. x+302 pp., 190 figs., 2 geol. maps, 4 geol. sections (in back pocket). Price £18.75.

There has long been a need for a comprehensive work on the Scandinavian Caledonides, and this one is by the leading Norwegian and Swedish authorities on the subject. It is written as two separate and quite different sections, the first by Strand on the Norwegian Caledonides, the second by Kulling on the Swedish Caledonides. There has been some attempt by the authors to agree upon common formation names across the international border (for example, Strand uses the older Swedish term 'Vemdal sandstone' for the formation commonly described in Norway as 'Kvartssandsten') but the only major structural unit agreed between the authors to be recognizable on both sides of the border is the Rödingsfjäll nappe, which lies high in the structural sequence at about the latitude of the Arctic Circle. Although Kulling's section is the second, readers would be advised to begin with it because it opens with a brief clear summary of the tectonic scheme, which Kulling uses as a framework for his regional descriptions. Although the scheme is perhaps over-simple, it is probably right in principle, and in the critical nappe region of central southern Norway it has supplanted Strand's own earlier views, as he acknowledges (p. 32). Strand has a more difficult task than Kulling's, because of the greater area and complexity of the Norwegian Caledonides, and tackles it geographically, avoiding sweeping tectonic syntheses. His account is encyclopedic, and includes not only most published work up to 1967, but also summaries of Diploma theses of Norwegian universities, which often go unpublished. It can only be followed with the aid of a large-scale geological map of Norway: the publishers do not provide one. Strand's caution has been justified by research since 1967, which has produced revisions of the major tectonics of the Trondheim area, Nordland, and the Seiland mafic-ultramafic province. The book is more concerned with stratigraphy and tectonics than with metamorphism and igneous activity, but it is a valuable source-book for serious research workers interested in all aspects of the Caledonides. It is a pity that it has taken so long to produce, has no accompanying geological map, and is so expensive.

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