most of the mineral names are still recognizable, e.g. lucoxene, kalinite, colphane, silliminite, eucriptite, speryllite, pentalandite, andalalusite, and hyperstehene; 'granitold' is an attractive term as is 'the calc-alkaline suit', but the flavour can be represented by the statement (p. 40) that copper is also found in 'fluvatile, lacastrine and esturine' sediments. These blemishes can be easily rectified, however, in the later impressions which will surely be needed; this book will meet with widespread approval in almost every aspect except its very high price.

R. A. HOWIE

Ramdohr (P.) and Strunz (H.). *Klockmanns Lehrbuch der Mineralogie.* Ferdinand Enke Verlag, Stuttgart, 1978. 876 pp., 261 figs. Price DM 168.

This sixteenth edition of the classical German-language mineralogy text follows its predecessor after an interval of some eleven years. The layout has changed little since 1967. Part I (Crystallography, 337 pages) remains largely unaltered apart from the sections on crystal optics which are completely revised and extended. Part II (Mineralogy, 503 pages) now includes short descriptive sections on meteorites and lunar rocks. The systematic mineralogy section occupies 417 pages, an increase of nearly 30 since 1967, reflecting the inexorable growth in the number of minerals granted species status. The welcome addition of an appendix to this section includes minerals described up to the latter part of 1978.

A. M. CLARK

Yariv (S.) and Cross (H.). *Geochemistry of colloid systems for Earth Scientists.* Berlin, Heidelberg, and New York (Springer Verlag), 1979, xii + 450 pp., 86 figs., 32 tables. Price DM 110.

Colloid or surface chemistry has long been recognized as an important branch of physical chemistry. It is surprising that so few texts have set out to cover its principles in the context of 'earth science' phenomena. The one notable example is van Olphen's *An introduction to clay colloid chemistry* which was published as long ago as 1963 (Wiley Interscience). Although Yariv and Cross cover much the same ground in their treatment of theory, the scope of this new text is very much wider. A real attempt at comprehensive coverage of 'earth science' phenomena has been made and this must be welcomed.

The introduction is concerned with defining terms and summarizing properties insofar as they fall within the scope of colloid science. Rather surprisingly a section on silicate structural chemistry is included. In my opinion this would be better placed (and expanded) in Chapter 1 as a prelude to the description of clay mineral structures, chemistry, and properties. This forms part of a discussion of colloids in the sedimentary cycle. Other examples of geological colloid systems are also given: magmas and volcanic eruptions, the Ocean, and the Atmosphere.

Having 'set the scene' the authors devote Chapter 2 to a fairly detailed account of the theory of the physical chemistry of surfaces. A good reference list should allow the reader to pursue any of the topics further without difficulty. This 'slice' of theory is then applied to dissolution and precipitation processes in natural systems (Chapter 3). A useful section dealing with aluminium and iron in natural water is included. Surface coatings on rocks and mineral grains is the subject of Chapter 4 and it is good to see this important topic treated on its own. A return to theoretical treatment follows in Chapter 5 where the kinetic properties of colloid solutions are summarized and discussed. Thereafter two interesting chapters are devoted to the 'colloid geochemistry' of silica and clay minerals respectively. I should have welcomed a rather more comprehensive treatment of silica diagenesis (section 2.2.4) but this perhaps reflects my own interests. Nevertheless it is an area of great interest at the present time. Chapter 8 deals with interactions between solid particles (both gaseous and liquid systems) and this is where the all-important 'double layer' forces are treated.

Rheological properties of colloid systems are dealt with in Chapter 9. After another brief introduction to theory, the rheological properties of both dilute and concentrated clay-water suspensions are considered. The final chapter then considers the colloid geochemistry of argillaceous sediments. This more or less amounts to a review of the literature of burial diagenesis with attention drawn to surface phenomena or their consequences. It is neither very thorough nor very comprehensive but will serve as a useful introduction for workers or students not familiar with the field. Section 4 is entitled 'Diagenesis of organic matter and oil generation in argillaceous sediments' and lasts from page 419 to page 426. The publisher's claim that '... and the literature of specialised areas of colloid and petroleum geochemistry is covered comprehensively' does not seem well justified.

In summary, this text provides adequate coverage of the theoretical background to colloid science. Its real value, however, lies in its literature

coverage and its numerous examples of colloid phenomena in surface and sediment systems. It brings together research reports from many different disciplines and should lead the diligent reader into new literature. Any text which encourages students or research workers to cross traditional boundaries and to look outside the few journals they habitually read is to be applauded. Geochemists with no formal training in surface chemistry would do well to read this book if only to see just how widespread colloid phenomena are. I am glad to have a copy of this text on my shelves, but doubt that, at the price, many graduate students will rush out to buy one.

C. D. CURTIS

Barker (F.), editor. *Trondhjemites, dacites, and related rocks* (Developments in Petrology: no. 6). Amsterdam, Oxford, and New York (Elsevier Scientific Publishing Co.), 1979. xv+659 pp., 211 figs. Price $65.75 (Dfl. 135.00).

Trondhjemites occur in several different tectonic environments and with different suites of associated igneous rocks. Some are accompanied by volcanic rocks of similar composition; others appear to be the products of metasomatism. Not surprisingly, there are many different ideas on their origin. Descriptions of trondhjemites are dispersed through the literature of petrology and regional geology, many occurrences being recorded only incidentally in accounts of larger areas of granites, ophiolites, or metamorphic rocks. The editor of this volume, Fred Barker of the US Geological Survey, has performed a valuable service by bringing together this collection of twenty-two papers on trondhjemites and related rocks from all over the world (M.A. 79-3231). It is now possible to examine side-by-side the critical features of different kinds of trondhjemite, and to form a coherent view of these rocks, perhaps for the first time. In addition to reviewing our existing knowledge, the individual authors have contributed a wealth of new information on their field occurrence, petrography, chemistry, and mineralogy.

At least four distinct categories of trondhjemite can be recognized in the selection of examples which are described. The first group are those of Proterozoic to Cenozoic orogenic belts, where they are associated with larger volumes of granite, granodiorite, tonalite, and diorite. The type area around Trondheim in Norway, which is reviewed here by Barker and Millard, is of this type, although it is not a very suitable type locality because the trondhjemites there have undergone greenschist facies metamorphism. The second type of occurrence is in island arcs, such as the examples from Fiji which are described by Gill and Stork. In Fiji, intrusive trondhjemites are accompanied by compositionally similar low-K dacites. The third type of trondhjemite is that which occurs in Archaean grey gneiss terrains. This is the environment in which trondhjemite is most abundant and in which it is a major rock type. The Archaean trondhjemites may well have originated in a different way to later ones, but the deformation and metamorphism they have suffered is an obstacle to their complete interpretation. The excellent field photographs in the articles by McGregor and by Collerson and Bridgwater on areas in Greenland and Labrador show all manner of streaky deformed rocks, and one can only marvel at the confidence with which Precambrian specialists are able to assign an igneous identity to some of the streaks. The fourth type are the trondhjemites which occur in small amounts in ophiolite complexes. They are clearly different in nature to the other trondhjemites, and are well summarized in the article by Coleman and Donato, who consider them to have originated in the oceanic crust.

The petrogenetic conclusions of the various authors are so diverse that no single viewpoint can be cited as representative, but there are some broad areas of agreement. The magmatic origin of trondhjemites is generally accepted, not only for those with close volcanic equivalents, such as the Fijian examples, but also for others for which a metasomatic origin has been postulated in the past. A comprehensive 110-page review of the chemistry and mineralogy of salic lavas by Ewart enables the trondhjemitic dacites to be seen in the context of acid volcanism as a whole. The origin of trondhjemite magma is a more open question, but the majority of the authors look to a basaltic source, some by way of re-melting, others by simple differentiation. Whatever their views, future workers on trondhjemite will find this volume indispensable.

A. HALL

Bambauer (H. U.), Taborszky (F.), and Trochim (H.). *W. E. Tröger: Optical Determination of Rock-forming Minerals. Part I: Determinative Tables.* Stuttgart (E. Schweizerbart'sche Verlagsbuchhandlung), 1979. 188 pp., 376 figs., 3 pls. (1 in colour). Price DM 48.00 ($27.20).

This is a translation of the fourth German edition of the well-used optical determinative tables of the