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

late W. E. Tröger. It is a useful, well-produced, resiliently bound compendium of mineralogical information that will be welcomed by English-language readers.

Although the book emphasizes optical properties with the familiar crystal representations with schematic optical directions and graphs relating composition to optical variations, there is also a wealth of summarized information about density, crystal form, chemical reactions, petrological occurrences, principal *d*-spacings, etc. A magnificently produced colour chart shows accurately the birefringence colours up to 0.20.

A number of criticisms must be made. In the tables the translators state that 'some "old" crystallographic settings have been retained for internal consistency with previous editions'—hardly a justifiable reason in a new edition. The confused problem of identifying Fe-free and ferrian zoisite is for example exacerbated by use of the old crystallographic setting. Many graphs relating solid solutions to composition have not been revised for so many years, despite much available new information, that the graphs have little value, e.g. melilites 1950 and 1951, vesuvianite 1950, tourmaline 1951, nepheline 1941, beryl 1927. The chart relating 2V to composition in the orthopyroxenes repeats the error of distinguishing volcanic and plutonic samples despite this error being pointed out 11 years ago.

Perhaps the best correlation graphs are those for the plagioclases which are based on Burri, Parker, and Wenk's comprehensive 1967 survey, but the olivine and K-feldspar graphs are also modern. Correlations in the complex mica and amphibole groups are almost unusable because of overlapping optical properties in minerals of quite different chemistry.

The question that increasingly looms before mineralogists and petrologists is the extent to which books of this type are now used other than to assist in the identification of minerals as distinct from determining their compositions. More and more the microprobe is used to give precise compositions with respect to all major elements instead of the crude approximations of composition at the best obtainable by optical determinations. The labour of refractive index determination and precise Universal stage work necessary to estimate compositions from optical properties is now rarely justified.

The translators are to be commended for producing an accurate translation in good English of a book that will be a useful laboratory manual. Whether students will choose to purchase this book at £12·50 when there are so many other available mineralogical textbooks, many containing in addition systematic treatments of petrological and crystallochemical aspects, remains doubtful.

B. E. LEAKE

Roberts (B.). *The Geology of Snowdonia and Llŷn: an outline and field guide.* Bristol (Adam Hilger Ltd.), 1979. x + 183 pp., 30 figs., 31 geol. sketch-maps, 1 geol. map (1:70,000). Price £15.00.

As the title suggests, this guide is divided into two sections. The first section (44 pp.) briefly but clearly outlines the stratigraphy and structural history; the area consisting of Cambrian and Ordovician sediments and igneous rocks on a late Precambrian metamorphic basement. The igneous rocks include layered mafic intrusions, mafic intrusions, microgranites, dolerites, tuffs, lavas, and ignimbrites. The metamorphic basement is related to the Mona Complex of Anglesey and shows a progression in metamorphic grade (and texture). Throughout the area all the abovementioned rocks are deformed (often intensely), thus this is an excellent centre for structural geology.

In the second section (124 pp.), thirty-one different field excursions, each with an accompanying geological map and a different emphasis, are described in detail. To complete all thirty-one itineraries would take about two months but the author suggests a shortened programme of about one week's duration which is suitable for an undergraduate field course. To the visiting geologist, the outline should assist him in choosing itineraries of particular interest. This book is unlikely to be of use to the undergraduate student; the outline would serve as a summary of the geology but the field itineraries contain too much information of the type that a student would be expected to record at the outcrop. Conversely this wealth of information, together with the details of access, tides, type of walking encountered, and estimated time for each excursion, will make this guide valuable to the geologist leading a field party into this area.

This guide is prepared in sideways A4 format with a flexible waterproof(?) cover so that although of large size (to accommodate the large scale maps) it can be rolled up and carried in a rucksack. It is to be hoped that the quality of the paper and binding are such that they will withstand the bad weather often encountered in this part of Wales.

M. E. JONES