suggested. (1) Cross-referencing could be introduced so that when a mineral also occurs in another illustration this could be drawn to the reader's attention. Thus nearly half the view depicting anthophyllite shows typical cordierite but no reference is made to this under cordierite. (2) Much more emphasis should be given to diagnostic or special features. Thus to a student colourless (or even slightly pleochroic) andalusite and orthopyroxene are readily confused; both have two cleavages apparently at right angles, both have low birefringence, straight extinction, and they have similar forms. Why not point out that the length-fast and length-slow nature of side sections is diagnostic? Muscovite and talc are effectively indistinguishable by a student. Why not point this out? Although the possible confusion of lamellar-twinned cordierite with plagioclase is pointed out, the fact that the lamellar twinning in cordierite rarely extends across the whole grain is not mentioned although two photographs clearly show this. (3) About two-thirds of the pages could have accommodated double the number of views with only slight re-arrangement of the layout and with the variety to be found in minerals this would give better value to the student. To be fair, several minerals are allocated more than one page, melilite for instance with five views is particularly well done. Despite four views of cordierite, none contains a sector twinned specimen and aragonite is not included in the book. (4) The decision not to show straight extinction pleochroic minerals parallel or perpendicular to the polarizer (because such crystals will be in extinction under crossed polars) is often unfortunate because the maximum diagnostic colour and its direction are not always clear, e.g. the normal deep absorption of tourmaline in the 'vertical' position distinguishes it from most other common coloured minerals but to explain this involves the authors in a long explanation which will not be readily followed by elementary students. Perhaps some grains could have been shown in varying positions from 'horizonal' to 'vertical'—a section of radiating tourmaline for instance?

Other points that came to my attention were the lack of baryte, gypsum or anhydrite (surely commoner than yoderite or astrophyllite, which is not shown in the usual needle-shaped crystals but in irregular shapeless crystals with two nearly identical views in plane polarized light?). I thought the sapphirine lacked its commonest violet-blue colour, orthite frequently has a very low birefringence due to metamict decay, the apatite was rather poor and the rutile distinctly atypical and lacking its diagnostic golden-brown colour.

However, I suspect that the writers did not find it easy to obtain every thin section as they would have wished and the above points are suggestions for possible improvements. The book is strongly recommended for student use and is good value at a modest price.

B. E. LEAKE

Augustithis (S. S.). *Atlas of the Textural Patterns of Basic and Ultrabasic Rocks and their Genetic Significance.* Berlin (W. de Gruyter), 1979. x + 107 pp., 733 photographs, 47 figs. Price DM 255.

The title of this book suggests that it is a comprehensive treatment of the petrographic features of basic and ultrabasic rocks. On the contrary, it consists of thirty-four chapters (1–5 pages long) on more or less unrelated topics, followed by 264 pages of illustrations, mainly photomicrographs. Many of the chapters are centred on a single, often obscure, example, which is frequently drawn from works by the author or Drescher-Kaden, and ignores better known examples. Among the worst instances of this are Chapter 2 (Metasomatic Transformations of Marbles), which discusses only an example from Trivena, and Chapter 5 (Eclogites and Eclogites) which is a very narrow and unbalanced account illustrated by thirty-eight photographs, of which thirty-seven are of 'eclogites' from Galicia. Indeed, the lack of omphacite (no clinopyroxene is mentioned in the text) and the spessartinic nature of the garnet casts doubt on the validity of these as examples of eclogite. The bias in the selection of examples, however, pales into insignificance compared to that in the interpretations of the rocks; in short, the author seems to have set out to prove that as many basic and ultrabasic rocks as possible are of non-magmatic origin. Inevitably, such a biased viewpoint leads to suggestions which are totally unacceptable to most petrologists.

The philosophy behind the book seems to be summed up by the statement in the Preface that 'the recognition of textural patterns is ... genetically more important than ... mineralogical or chemical criteria . . .'. The folly of this approach is exposed time and again in the text: for example, in Chapter 4 what are obviously (igneous) dykes of hornblendite in the Seriphos granite are interpreted as metamorphosed vein-form xenoliths of country rock while in Chapter 11 features from undoubtedly magmatic lamprophyre dykes are described as 'blastogenic textural patterns'.

Several chapters are wholly or partly devoted to the hypothesis that the plutonic gabbros, norites, troctolites, etc. (Chapters 7, 8, 9), including those of layered complexes (Chapters 14, 15, 16) such as

the Skaergaard and Bushveld (Chapter 17—'Is the Bushveld Complex Igneous?') are of non-magmatic origin. This argument is based almost entirely on the highly subjective interpretation of two textural features. The first is the slightly rounded and 'corroded' nature of the plagioclase crystals poikilitically enclosed in clinopyroxene (or of olivine crystals in plagioclase). According to Augustithis 'these ophitic intergrowths are not due to simultaneous pyroxene/plagioclase crystallisation' but are 'blastogenetic'; an interpretation which pays little heed to recent work on the importance of diffusion in the melt around growing crystals or the effects of mutual interference at the interfaces of crystals. The second is the interpretation of the late-stage granophyric quartz/feldspar intergrowths in rocks such as the Skaergaard gabbros as metasomatic. That these interpretations could be taken as evidence for a metamorphic/metasomatic origin for gabbroic rocks in general and layered intrusions in particular in spite of the enormous wealth of field, geochemical, mineralogical, experimental, petrographic, structural, and other evidence to the contrary not only exposes the philosophical fallacy behind much of this book, but virtually destroys its credibility.

The anti-magmatic bias so pervades this book that it comes as both a surprise and a relief to discover (in Chapter 19 on the Archaean spinifex rocks) that spinifex texture is accepted as a magmatic phenomenon, although the author does not seem to appreciate the importance of the difference between supersaturation and supercooling in this context.

Two other criticisms of this book are that it contains several pointless chapters (for example, Chapter 14 on 'Layered basic and ultrabasic complexes' consists simply of four pages of quotations from other, often well known, works) and that in many cases extensive literature is ignored. Noteworthy in the latter context are Chapters 13 (Kimberlites) and 5 which is devoted almost entirely to the Galician 'eclogites' but makes no mention of the extensive, and more accurate, account by Vogel. There is also a tendency for over-illustration, notwithstanding the fact that it is an 'atlas', with numerous instances of several photographs showing the same thing. On the whole photographs are good although the photomicrographs tend to lack enough contrast for my personal taste.

Technically, the presentation is quite good with relatively few printing errors, but the text is written in rather clumsy English which, together with an excess of overlong technical jargon, makes it read more like a translation than an original text. More serious, however, is the strange fragmented style in which it is written, there often being no obvious connection between one sentence and the next, which can make it difficult to follow the sense of the argument. Also, there are numerous minor flaws ranging from mistakes such as not realising Gwyneth (Challis) is not a 'him' to the irritating use of words like 'olivinefels' (instead of peridotite), etc.

If this book had been the objective and comprehensive study of the petrographic features of basic and ultrabasic rocks that its title implies it would have been a useful reference work in spite of its price of around £61·00. However, in view of the controversial nature of much of the interpretation accompanying the photographs, and the extremely restricted, if not biased, coverage of topics and examples, it is difficult to envisage much of the market for this book.

F. G. F. GIBB

Moseley (F.), Editor. *The Geology of the Lake District*. Leeds (Yorkshire Geol. Soc.), 1978. viii + 284 pp., 83 figs., 13 pls., 1 coloured geol. map. Price £6·50.

The English Lake District is an area of outstanding beauty and scientific interest. Over the past decade it has featured prominently in plate tectonic interpretations of the evolution of the Caledonides and yet, before the publication of this book, the only comprehensive account of its geology was published in 1916! It is appropriate, therefore, that the Yorkshire Geological Society should choose 'The Geology of the Lake District' as the title of the most recent addition to its Occasional Publications Series. It is particularly appropriate that this volume should be dedicated to the memory of the late Dr G. H. Mitchell whose work on the stratigraphy and structure of the Borrowdale Volcanic Group did so much to increase our understanding of Lake District geology.

The book comprises eighteen chapters written by research workers active in the area and covers every aspect of the subject. In an introductory chapter, Moseley reviews the geological history of the Lake District and places the area in the context of the geological evolution of the North Atlantic region. This is followed by a review of Lake District palaeomagnetic data by Faller and Briden in which the authors show how the latitude and meridional orientation of the British Isles have changed since the Ordovician.

The next three chapters discuss the structure of the Lake District. Chapters by Bott on the pattern of gravity anomalies and by Collar and D. J. Patrick on the results of the IGS aeromagnetic survey set geophysical constraints on the deep