

chapter on computerized image analysis? I cannot think of any group of readers to whom I could recommend this book.

J. F. W. BOWLES

Rode (O. D.), Ivanov (A. V.), Nazarov (M. A.), Cimbálníková (A.), Jurek (K.), and Hejl (V.). *Atlas of Photomicrographs of the Surface Structures of Lunar Regolith Particles*. Dordrecht, Boston, and London (D. Reidel), 1979. 76 pp., 82 pls. Price \$39.00 Dfl. 80.00.

This atlas contains 164 SEM photomicrographs of regolith particles from the Luna 16 and 20 missions. The text is in Russian (35 pages) and English (30 pages), followed by 3 pages of references, to 1975, with one Russian reference dated 1979. Each plate has an explanatory caption. No chemical data are given though the photographs are classified by subject into rocks, glasses, olivines, and plagioclases. The range in magnification used is from $40\,000\times$ to $48\times$ with the majority at about $1000\times$. The photographs are of reasonable quality and show a variety of surface features. Their appeal, and that of the book, is likely to be limited to those with a particular interest in grain morphology on a fine scale.

A. L. GRAHAM

Arcyana [Cheminée (J.-L.), Hekinian (R.), Le Pichon (X.), Choukroune (P.), Francheteau (J.), Bellaiche (G.), and Needham (D.)] *FAMOUS: Photographic Atlas of the Mid-Atlantic Ridge; rift and transform faults at 3000 meters depth*. Paris (Gauthier-Villars/CNEXO), 1979. 128 pp., 425 photos, 3 folding maps. Price 150 FF.

FAMOUS (French American Mid-Ocean Undersea Survey) was a scientific expedition of great achievement. By the early nineteen-seventies it was generally accepted that the mid-ocean ridge systems of the world played a crucial role in geodynamics, as the sites of the spreading axes where lithospheric plates were formed and separated. Nevertheless, this concept was vague in detail. It relied entirely upon bathymetric maps and several lines of geophysical evidence, because no part of the typical ridge axis is exposed subaerially. FAMOUS took the first step in resolving this problem during 1973 and 1974, by making a very detailed survey of the section of the Rift Valley of the Mid-Atlantic Ridge between $36^{\circ} 30'$ and $37^{\circ} 00'$ N, at a water depth of between 2500 and 3000 m. In addition to geophysical studies (a phase which included UK participation), the area was criss-crossed by three miniature submarines packed with volcano-

logists and petrologists. This atlas includes a selection of 430 photographs from the thousands taken. It is restricted to the data obtained by the French crews of the vessels *Archimède* and *Cyana*.

The atlas appears to have three distinct objectives: (1) to provide a complete record of the field geology of the area, as an essential background for anyone reading the numerous detailed published studies; (2) to contribute towards our knowledge of volcanology and tectonics; (3) to give a general account of the achievements of FAMOUS, suitable for a wide scientific readership (including the sponsors of the work). There are duplicate texts throughout in French and English. These are printed side-by-side, which is a great advantage because the minor abbreviation of the English text and occasional slight hiccups in the translation may be corrected at once by reference to the French original.

The introductory chapter of the volume is an excellent general account of the geology of the area. A series of detailed bathymetric maps and photos of a scale-model enable the reader to obtain a vivid over-all impression of the topography. This includes a segment of the Mid-Atlantic Ridge rift valley, a transform-fault fracture zone, and the complex area where they join. The plates are grouped to illustrate these three distinctive areas, including the hydrothermal deposits in the fracture zone. Each page of photographs is accompanied by a table of technical data and a locality map, so that every view can be related precisely to the area as a whole. With few exceptions the photographs are sharp and have printed clearly. Each group is accompanied by a descriptive geological text and a note on any interesting life forms.

The photographs which are probably the most successful from a geological point of view are those showing the diverse forms of basalt extruded on to the ocean floor. These offer immense possibilities for improving our understanding of ancient pillow lavas and their related deposits. The terminology erected by the authors for these extraordinary eruptive forms is robustly Gallic. Thus phalli are pictured inflated and collapsed—with and without warts. Both are carefully distinguished from coliform lavas, which the English text transliterates from the French as 'tripe-like'. (A visitor to France might be well advised to remember this before ordering a dish of tripe and onions!)

Some of the photographs of structural features in both the rift valley and the fracture zone are spectacular and easy to understand. Nevertheless, many of these pictures suffer from the same problem as besets innumerable published photographs of field features; namely that the interpretation which appeared so obvious to the photographer is far less

apparent to the reader. It would have been a great help, if the descriptions accompanying such photographs had included labelled key sketches. The other criticism which needs to be made is more concerned with the FAMOUS project as a whole than this particular book. If this was truly an international enterprise, why must all the publications be so assiduously confined to either the French or the American sub-section of the area? The impact of this atlas would have been increased greatly, if it had been combined with its American counterpart into a single comprehensive volume. As it is, the potential buyer must decide whether to invest in the northern or southern part of FAMOUS. Only those with limitless budgets will afford both.

R. N. THOMPSON

Reeves (R. D.) and Brooks (R. R.). *Trace Element Analysis of Geological Materials*. New York (J. Wiley & Sons) 1979. x + 421 pp., 70 figs. Price £19.50.

Several books have appeared within the last decade in the field of analytical geochemistry, and this most recent addition must therefore compete with previous works. It does, however, specifically cover trace element analysis and it seeks to 'be of use not only to those with formal training in analytical chemistry and geochemistry, but also to those who are being drawn into this field from many other branches of science'.

After a short introductory chapter, a chapter is devoted to 'sampling and storage techniques'. This contains many platitudes including, for example, an exhortation to use plastic containers for the storage of solid samples 'because they are unbreakable and much less likely to contaminate the material'! The book continues in the same vein, with chapters on physical and chemical methods of sample pretreatment. Generalities abound, but specific information is lacking, although there are extensive collections of references.

The main part of the book is taken up with an account of various analytical methods, including those which are currently most widely used for trace element analysis. These chapters include some valuable accounts of the theoretical background to the analytical methods, which are most welcome. However, no attempt is made to provide detailed information on analytical methods. A reader seeking information on how to analyse a sample for a particular element would be little wiser from reading this book, nor would he receive advice on which method to use. There is also some lack of balance in the attention devoted to the different methods,

molecular fluorimetry rates almost as much space as X-ray fluorescence, and the suggestion made that the *precision* achieved by X-ray fluorescence is only 5-10% leaves the impression that practising analysts have not been involved in the preparation of the text.

The book concludes with chapters on 'Uses of data on trace elements in geological materials' (which is of little geological value) and a chapter on 'statistical interpretation of geochemical data' which is of use.

Overall it is difficult to recommend this book, the lack of specific information on the analytical methods is a serious handicap, although the accounts of the theoretical background and the considerable collection of references may assist some readers.

J. N. WALSH

Pies (W.) and Weiss (A.). *Crystal Structure Data of Inorganic Compounds. Part c. Key Elements: N, P, As, Sb, Bi, C. Key Element N (Substance Numbers CI . . . CI133)*. (Landolt-Börnstein: Numerical Data and Functional Relationships in Science and Technology, New Series. Group III: Crystal and Solid State Physics. Vol. 7. Springer-Verlag. Berlin, Heidelberg, and New York, 1978. xxv + 260 pp., 35 figs. Price DM 290 (\$145).

This is a further volume in the series of comprehensive crystal structure data compilations for inorganic compounds (*Mineral. Mag.* (1979), **43**, 187). The key element is nitrogen, thereby covering ammonia and its derivatives, azides, and oxy-compounds of nitrogen. Mineral species under these headings are few and far between but include osbornite, sinoite, kleinite, nitratine, nitre, nitramite, nitrobarite, nitrocalcite, buttggenbachite, darapskite, and humberstonite. The data are clearly presented and, again, the series can be recommended to laboratories specializing in inorganic crystal-structure studies.

A. M. CLARK

Journal (A. G.) and Huijbregts (Ch. J.). *Mining Geostatistics*. London & New York (Academic Press), 1978. x + 600 pp., 267 figs. Price £32.00.

Geostatistics is a relatively young branch of statistical estimation theory pioneered by Professor G. Matheron, founder of the Centre de Géostatistique, Fontainebleau, in the mid 60s. Both the authors were members of his research group since its