

(Mti. Vulsini and Lake Bolsena, 14 pp.; Mti. Cimini and Lake Vico, 16 pp; Mti. Sabatini, 7 pp.; Colli Albani, 16 pp.); C—Mte. Somma and Vesuvius, 94 pp. The description of each district begins with an outline of its volcanic history and petrology, illustrated by abundant clear sketch maps (some folding), sections, petrogenetic diagrams, and chemical analyses and modes of representative rocks. This is followed by suggestions for individual excursions, well set out with sufficient details of the best exposures to enable them to be followed easily and profitably. Vesuvius, with its 94 pages, is given admirably full and detailed treatment. Volume I ends with a general bibliography and bibliographies for each individual volcanic province treated in the volume; a glossary of obsolete rock names encountered in the older literature, with Streckeisen equivalents; and subject and locality indices.

Volume II follows the same plan. An outline of Streckeisen's rock classification is given again, the rest of the volume being devoted to the remainder of the Campanian province (Vesuvius having been dealt with in Volume I): Roccamonfina, 13 pp.; Campi Flegrei and Pròcida-Vivara, 79 pp.; Ischia, 58 pp.; the Ponza islands, 14 pp. Bibliographies and indices follow the same pattern, and the volume ends with a folding geological sketch-map of the Phlegraean Fields with a red-printed overlay showing the volcano-tectonic features.

The whole work is most praiseworthy and valuable, providing for the first time an accessible, detailed, and up-to-date guide to the Italian volcanic districts. Its existence may stimulate more geological visits to classic but too little-known territory. English-speaking visitors might perhaps wish that a British or American geologist had been sufficiently stimulated to do what Dr. Pichler has done, but his contribution is outstanding and he lays all interested in the Italian volcanoes under a deep debt of gratitude. His German is straightforward and easy to read, helped by well-chosen illustrations and maps. The volumes are produced in a useful format, 19.5 × 13.5 cm, with linen cloth covers. Printing and layout are above reproach. Doubtless the final volume, when it appears, will reach the same high standard.

E. A. VINCENT

SANDER (B.). *An introduction to the study of fabrics of geological bodies*. Transl. from the German by F. C. Phillips and G. Windsor. London and New York (Pergamon Press), 1970. xvii+641 pp., 319 figs., 8 pls. (4 in colour). Price £12.00 (\$32.00).

This translation of the original two-volume work 'Einführung in die Gefügekunder Geologischen Körper' will be welcomed by all of those interested in the fabrics of rocks. This classic work must be one of the most quoted titles in reference lists, and although many structural geologists have used it as their 'bible' probably most of those who refer to the original book, the reviewer included, have never been able to face the formidable task of reading the original from cover to cover. The original book was written in the accepted German literary style that developed between the wars, a style that was based on the ideas first that the world was a difficult and complex place and discussions of it must be likewise, and second that the written word must be impressive and that simple statements are less impressive to a reader than complex

ones. It was certainly a relief to the reviewer as he was trying to struggle through the original text to discover that those completely fluent in German also found the work difficult to the point of obscurity. Professor Phillips and Dr. Windsor had a formidable task before them and they are to be congratulated in having provided an excellent literal translation of the original. They have not tried to simplify the original sentence structure nor reinterpret the ideas put forward. The English text is therefore as difficult as the original, the language is complex and often overelaborate, the sentences heap clause upon clause to such an extent that the main threads of reasoning are often unrecognizable. A short quotation will give some idea of this language problem.

The morphological fabric is therefore either the observable Gestalt (that is, the totality of all the observable functional fabrics) or a concept which embraces all functional fabrics—united with each other in the same location—no matter to what extent they may be observable. It can be understood that this concept plays a larger role in those cases in which limitation to functions which can be investigated is of lesser importance. On this basis we can understand the division of work between the two intellectual attitudes, which on the one hand reproach one another with lack of scientific method and formlessness—for of course we should on no account speak of concepts which are not realities—and on the other hand with barrenness and aridity—for of course the concept also acts as a challenge to the increase of knowledge of the functional fabrics and their involvement in the Gestalt.

The first part of the book consists of an introduction to the concepts of fabric and fabric symmetry, and this leads on to an analysis of the geometric forms taken up by fabrics and structures seen in deformed rocks by the techniques of projections. These techniques are then applied to processes of the emplacement of igneous masses and of salt. The second part describes the methods whereby grain orientation may be measured and recorded, and the important techniques for locating the positions of grains having certain orientations (AVA analysis) are described and illustrated with beautiful colour plates.

The analyses of stress, strain, and displacement are incomplete by modern standards. Too much emphasis is placed on deformations produced by slip on shear surfaces, and the model of the simple shear card deck. Although Sander states that he is enthusiastic about the use of mathematical techniques as a method of geometric analysis of strain he only employs these methods for the unique simple shear model. All structural geologists should look carefully into the methods he suggests for describing deformation (abc axial cross, p. 69, and ABC strain ellipsoid axes, p. 37) and for describing symmetry (again with axes abc, p. 70). Because of the special characters of the deformation model he chooses to investigate the coincidences between the sets of axes that he deduces are not of general application.

The high price of the book is justified on its fine production on excellent paper. The drafting errors contained in the original have been corrected and the half tone and colour plates have reproduced surprisingly well and there are hardly any topographic errors. What criticisms one might make are criticisms of the original work, for example visual aids are not as abundant as one would like, and the illustrations of rock exposures in the field are of a much lower quality than those of polished specimens and photomicrographs.

Those English-speaking geologists interested in rock fabrics no longer have any excuse for leaving unread this classic work, but when they get to the end of this excellent translation they may be left wondering if the ideas expressed at such length are really so revolutionary or useful as the disciples of the Sander school have suggested.

J. G. RAMSAY

PERRIN (R. M. S.). *The Clay Mineralogy of British Sediments*. London (Mineralogical Society) 1971. vi+247 pp. Price (paperback) £3.00 (£2.00 to members); \$7.50 (\$5.00 to members).

This is a useful work, which sets out to bring together the results of clay-mineral analyses of British rocks within two covers. These analyses are scattered through a wide range of geological and international literature, of research reports and in private files, and all those working in this field will have cause to be grateful to Dr. Perrin for this effective compilation.

The tables are arranged stratigraphically, though a geographical index is provided. Each sample is recorded with its stratigraphical horizon, a brief description of the gross lithology, its locality, and a National Grid Reference. The size of sample, its method of preparation and analysis, the laboratory used, and the date of analysis are given.

Analyses range from 1947 onwards, and in that time the nomenclature of clay minerals has undergone a series of changes; a process that will no doubt continue for some time to come. The author has very sensibly seen fit therefore to group his minerals under four headings only—kaolinite, mica, smectite, and chlorite; with a column for 'others' and for 'non-clay minerals'. Whilst the specialist might find this too broad a grouping, it is pointed out that it is these percentages that carry the stratigraphical and palaeogeographical implications. Each stratigraphical section is preceded by a short introduction, which outlines the main features of the age-group; and the book concludes with a chapter in which each of the clay groups is discussed in detail. This latter is a brief but succinct account of the origin and diagenesis of clay minerals in sedimentary rocks. Whilst this inevitably reflects the diverse opinions of the many authors whose work it summarizes, it does draw attention to some implications of clay-mineral distribution that may not have been appreciated, e.g. the remarks on the distribution of chlorite on pp. 209–10.

The book ends with the presentation of the results of a co-operative analytical study, in which four identical whole-rock samples and two preparations were submitted to seven different laboratories for analysis. The results are given in tabulated form; and the author hopefully concludes that there is broad agreement at a semi-quantitative level, although there are appreciable differences in detail. In general the results are probably better than most workers in this field might have expected.

The author and the Clay Minerals Group can be congratulated on their very practical production.

J. E. PRENTICE