

different causes of instability including: dyke intrusion (Elsworth and Voight; Tibaldi); pore pressures (Day); regional stresses (Russo *et al.*) and basement geology (Van Wyk de Vries and Borgia). Unsurprisingly there is a strong emphasis on European volcanoes, in particular there are five papers alone concerning instability on Mt Etna. These include: coastal elevation changes (Firth *et al.*); slope stability and eruption prediction Murray and Voight); aseismic creep (Rasà *et al.*); the boundaries of large scale collapse (Rust and Neri) and recent seismicity (Montalto *et al.*). In addition there are seven other papers covering aspects of other volcanoes in Southern Italy and Sicily.

The different ways in which volcanoes may undergo instability are tackled by the bulk of the papers. There are four papers on caldera formation. These include Mars (see above), Deception Island (Marti *et al.*); Bracciano, Italy (DeRita *et al.*) and Roccamonfina, Italy (DeRita and Giordano). Gravitational landsliding particularly on island volcanoes and the Tsunami related hazards are represented by papers on the Canary Islands (Carracedo), Hawaii (Garcia) and Kick 'em Jenny in the Eastern Caribbean (Smith and Shepherd) and Piton de la Fournaise, Réunion (Labazuy).

Details of the deposits or products of instability are covered by only two papers both of which cover a range of deposit types on Mt Vulture, southern Italy (Duncan *et al.*) and Hokkaido, Japan (Yamagishi). I would have welcomed more on debris avalanche deposits although this is only a minor complaint as any book which covers such a wide theme as volcano instability will always have some omissions.

Other papers cover subjects such as spectral analysis of volcanic tremor on Stromboli (Carniel *et al.*), recent up lift on Ischia, Italy (Buchner *et al.*) and topographic characterization of volcanoes (Garvin).

Generally this volume is comprehensive and I would recommend it to anyone working in the important field of volcano instability. P. D. COLE

Hochleitner, R., von Philipsborn, H. and Weiner, K. L. (Kristallzeichnungen von Rapp K.). *Minerale: Bestimmen nach äußeren Kennzeichen. 3. Auflage der 'Tafeln zum Bestimmen der Minerale nach äußeren Kennzeichen' von Hellmut von Philipsborn.* Stuttgart (E. Schweizerbart'sche Verlagsbuchhandlung/Nägele U. Obermiller), 1996. vi + 390 pp. ISBN 3-510-65164-2. Price DM 98~00.

This is the third edition of a book which has a long tradition in the German mineralogical literature. Various versions of these tabulated mineral proper-

ties have existed since their first publication in 1866 by Albin Weisbach, the Professor of Mineralogy at Freiberg. The philosophy of the book is in many ways similar to the early versions of Dana's Mineralogy, where it was argued that Mineralogy was a subject which cultivated the powers of observation, "a most essential element in the education of young people of both sexes."

The book is essentially a tabulation of mineral properties grouped according to the two most obvious macroscopic features – the colour of the streak, and secondly, the hardness. The Introductory chapter (60 pages) gives a broad outline of the chemistry of minerals including atomic weights and symbols of the elements in alphabetical order, and follows with a description of properties such as hardness, tenacity, density, streak, colour, lustre and so on. A further section deals briefly with mineral genesis in magmatic, sedimentary and metamorphic environments. The chapter concludes with a section on the external crystallographic features of minerals, dealing with symmetry and morphology in a traditional way.

The main body of the book lists, in over 300 pages, tabulations useful for mineral identification. It begins with an index defined by the principal chemical constituents, so that it is possible to refer to all sodium-bearing minerals, for example. A second table lists 487 minerals according to the streak-colour and the hardness. Each of these minerals, tabulated in the same sequence, is described in the rest of the book. The descriptions all follow the same format and are tabulated in rows and columns across facing pages. Each mineral is given a name, formula and general chemical analysis; the physical properties are listed, a drawing of a typical morphology included, and the crystal habit described. Another column comments on paragenesis and finally, a note is made of other similar minerals.

The book concludes with a section containing 64 colour photographs which group minerals according to some aspect of their appearance, such as crystal habit, symmetry, twinning and colour. The plates are of excellent standard although they could have been larger by making better use of the space allocated (4 prints to a page). There is also a list of terms used to describe minerals, with translations into English, French, Italian and Spanish.

Although nowadays electron microprobes and powder diffraction methods have replaced traditional mineral identification methods in many Universities, there is something to be said for being able to identify a mineral from a relatively few basic observations. For anyone needing to determine minerals from their physical properties in hand specimen, this will be a very useful book. It is very well produced and beautifully set out. A. PUTNIS