

The first two chapters give a mathematical treatment (based on Maxwell's equations) of anisotropy and isotropy, birefringence, and refractive indices, finally arriving at the indicatrix equation. There is an excellent tabulation of index planes and indicatrices of orthorhombic and monoclinic crystals, illustrating conditions for crossed, horizontal, and inclined dispersion.

Chapter 3 is of particular interest for any scientist employing transmitted light technique. It presents a critical survey of theories regarding the origin of the Becke Line and gives the author's mathematical derivation of this phenomenon—and of its occasional 'shortcomings'.

Interference of two waves with the same direction of vibration, and of two waves the directions of vibration of which are normal to each other, is considered in chapter 4: 36 diagrams summarize a variety of possible interference conditions at phase differences varying, in  $30^\circ$  steps, from  $0^\circ$  to  $330^\circ$ .

Chapter 5 discusses quantitatively the relations of light intensity and phase difference (with crossed polars only, and with test instruments or compensators). Of special interest are graphs for  $I = f(\lambda)$ ,  $\Delta = 0.001 - 0.022$ . The logical continuation of these considerations is the practical and mathematical aspects of the use of test instruments, to which chapter 6 is devoted. Separate sections deal with 'Berek', 'Ehringhaus', and 'elliptical' compensators. The optical activity of quartz (as an important raw material for the optical industry) receives special attention.

Birefringence caused by homogeneous distribution of isotropic or anisotropic particles in an isotropic medium is surveyed in chapter 7. This reviews the classical calculations of Wiener and proposes a simplified model.

The theory of optical effects in convergent light (chapter 8) includes a mathematical deduction of isochromatic lines and isogyres, and quantitative parameters of the distribution of light intensity within the field of view. The author also suggests an improved method for the calculation of interference figures.

An excellent and exhaustive survey of the determination of the optical character is given in chapter 9. Computer-plotted diagrams illustrate the quantitative distribution of light intensity in uniaxial and biaxial, optically positive and negative crystals cut normal to the optical axis (or the acute bisectrix, respectively).

Finally, the effects of absorption are given brief consideration.

This book is a most welcome addition to the library of anyone interested in transmitted light microscopy of crystalline substances. Let us hope there will soon be an English edition!

E. F. STUMPFL

ADAMS (J. A. S.) and GASPARINI (P.). *Gamma-ray Spectrometry of Rocks*. (Methods in Geochemistry and Geophysics no. 10.) Amsterdam, London, and New York (Elsevier), 1970. xi+295 pp., 108 figs. Price £7.75.

The title of this book is misleading as only two out of the seven chapters have much bearing on the gamma spectrometry of rocks. The impression gained is that the text material was gathered with little regard to a pre-defined title. This is not to say that the book is badly written, but that it presents physical theory not related to gamma

spectrometry; details of gamma-sensitive instruments without energy discrimination together with geological applications of such equipments; related and collaborative techniques such as neutron activation analysis; and case histories including geochronology and heat flow. The statement (two pages) on economic considerations is brief to the extent of being tantalizing, but not contributing anything material of value to the student or specialist reader.

The detailed information given in the form of tables and figures is relatively up to date and would be useful for anyone setting up a gamma-spectrometry laboratory. However, much of the information both on laboratory and field instrumentation is of limited use because it is dated and restricted largely to what is available on the North American market.

Literature coverage is considerable, but North American publications are unduly favoured.

S. H. U. BOWIE

PICHLER (H.). *Italienische Vulkan-Gebiete I* (xiii+258 pp., 48 text figs., 9 tables, 9 pls. including 5 folding maps), and *II* (x+186 pp., 50 text figs., 8 tables, 6 pls. including 4 folding maps). *Sammlung Geologischer Führer 51 and 52*, Gebrüder Borntraeger, Berlin and Stuttgart, 1970. Price: I (No. 51) DM 37.50; II (No. 52) DM 34.

These extremely valuable little volumes form Nos. 51 and 52 of a series of geological excursion guidebooks published by Borntraeger and mostly dealing with regions of Germany, Austria, and the Alps. The two present guides cover the Italian volcanic districts as far south as Naples and Ischia; a third, not yet to hand, will deal with Sicily (including Etna) and the Aeolian Islands.

The volumes can be highly recommended as the only convenient source of up-to-date information about a region of great geological significance and fascination. Some useful, but very brief pamphlets were prepared for the field excursions organized in connection with the 1961 International Association of Volcanology symposium in Italy, but these were never widely available; much of their contents has, however, recently been summarized in Rutten's 'Geology of Western Europe'.

But the present volumes are more than just excursion guides. The author, from the Institute of Mineralogy and Petrology at the University of Tübingen, spent two years with Professor Rittmann at the International Institute of Volcanology at Catania, and has made himself familiar with all recent research done in the region by the Italian geologists and others. He has taken the opportunity to summarize not only the field geology but ideas as well; a great deal of scattered work, largely published in the Italian journals, is collated and summarized.

The first volume begins with a Foreword, which includes an outline of Streckeisen's classificatory scheme for the igneous rocks, used throughout the work, followed by a 41-page section summarizing the general geology, structure, and tectonics in relation to volcanicity, and the nature and origins of the various magmas represented, stressing their probably largely anatectic nature. The remainder of the volume is divided into three principal sections: A—the Tuscan province (S. Vincenzo and Larderello, 10 pp.; Roccastrada, 4 pp.; Mte. Amiata, 13 pp.; Radicofani, 3 pp.); B—the Roman province