

## Volcanology

*Volcanic Landforms and Surface Features.* Edited by Jack Green and Nicholas M. Short. Pp. xxvi+519. (198 plates.) (Springer Verlag: Berlin and New York, 1971.) 116.50 DM; \$32.

THIS book has more than two hundred 29×19 cm pages of monochrome photographs of volcanoes, volcanic eruptions and structures of volcanic rocks, together with several of lunar features. The fourteen-page introduction by the late A. Poldervaart concisely reviews the whole field of volcanoes and their products, and defines most of the terms used. The book is rounded off by a glossary with between 500 and 1,000 entries and a useful collection of references. It aims to do for volcanology what *The Atlas and Glossary of Primary Sedimentary Structures*, by F. J. Pettijohn and P. E. Potter (Springer Verlag, 1964), did for sedimentology, but it does not succeed.

The photographs of volcanoes are, it is true, a pleasure to see (though they would have looked better on glossy paper) and convey an excellent impression of the great range shown in morphology and structure. Predictably, the very photogenic pahoehoe lava surfaces are well covered, but little is seen of the internal structure of lavas, and nothing is seen of the inside of an aa lava (except perhaps plate 76B in which some of the material described as "tuffaceous pyroclastics" may well be aa lava rubble seen in cross-section). The work is therefore of limited value to geologists working on pre-Quaternary volcanics who normally only see their rocks exposed in cross-section. It is the volcanoclastic rocks, however—the ones which most need treatment—which are dealt with least satisfactorily. The photographs are few and one cannot learn much from them or their captions. The only close-up of an outcrop of welded tuff (plate 168A) is a highly atypical example. A geologist who seeks guidance in distinguishing between the various kinds of volcanoclastic rock will be disappointed.

The captions to the photographs are of varied standard. Some carry much useful information and others very little. Some are unreliable: the cracks on breadcrust bombs are described (plate 161B) as shrinkage cracks"; it is stated (plate 162B) that "volcanic rocks carried in a nuée ardente do not show a serial change in vesicularity from rind to core", and the "pillow shaped structures in tuff" shown in plate 156B appear to be spheroidal weathering, while Anderson's observation of pahoehoe forming on the beach of Samoa is once again cited (plate 155C) as pillow lava.

In the introduction, "the presence of an unchilled, rolling upper surface pos-

itively identifies a flow" seems a dubious criterion by which to distinguish a lava flow from an intrusive sheet, and the common occurrence of offshoots from the latter intruded into its roof is not remembered. The old view is still maintained that the shape of bombs is due to "rotation in the air during flight" (also caption to plate 161C "aerodynamically shaped"). The captions to Figs. 3 and 4 are unfortunately transposed.

The glossary is in some ways less satisfactory than the introduction, for terms such as columnar jointing, composite lava, mantle bedding, spherulite, viscosity and xenolith are omitted and such strange entries as "burning mountain" and "ebullitim" (should this be ebullition?) included. I do not like the definition of gja: "a fissure from which volcanic eruptions take place. They may be filled with pyroclastics and lava as in the Norway-Greenland basin" (most Icelandic gjas have not erupted lava; the basin referred to is presumably Iceland). One could argue that a subaqueous tuff may be one accumulated under water and is not necessarily "formed by subaquatic eruptions", and it is quite wrong to say that acid lava, because it is stiff and viscous, "solidifies rapidly". Moreover the definitions given in the glossary and introduction do not always agree: for instance, coulee (I do not like the glossary definition: "an individual lava flow from the crater or flank of a cone forming a tongue-like extension down the cone").

This book is probably the largest and most comprehensive collection of volcanic photographs ever published, and it deserves a place on the shelf of every library of Earth sciences, although it is not cheap. However, it is unlikely to be as "acceptable to both students and professors in the universities" as the editors hoped, largely because they have not been sufficiently critical of its scientific content.

G. P. L. WALKER

## A Quick Look at Optics

*Introduction to Classical and Modern Optics.* By Jurgen R. Meyer-Arendt. Pp. xi+558. (Prentice Hall: Englewood Cliffs, New Jersey, February 1972.) \$15.95.

FOR a fair assessment of this book it is necessary to remember that the author's aim has been to cover the whole field of optics at a reasonable level but also within a reasonable number of pages. The average length of the thirty-four sections is sixteen pages, with, for example, ten pages allocated to the section on apertures, pupils and fibre optics, fourteen to aberrations, twelve to interference, sixteen to the quantum nature of light, ten to electron optics,

eighteen to holography, and so on. This could well provide just what the non-specialist needs, although some readers may feel that they are being offered mere snippets of information. Nevertheless, thanks to the clarity and economy of the writing and the excellence of the diagrams, it should be possible to obtain a first understanding of the essential elements of most of the subjects discussed. In any case, each section includes some very useful suggestions for further reading, together with some problem questions. From time to time a relevant laboratory experiment is described, while the occasional biographical note of a Nobel prizewinner or some other optical giant of the past adds a human touch to the text.

The selection of material to be included (or excluded) is not always as happy as it might have been. Thus, the section on the velocity of light has a very old-fashioned look about it, while in the radiometry section Bunsen's grease-spot photometer is described as if it were a modern photometric technique instead of being 130 years old. And it would probably have been better to omit colorimetry altogether rather than squeeze two pages' worth into the quantum optics section!

W. D. WRIGHT

## Early Essays

*The Experimenters: a Study of the Accademia del Cimento.* By W. E. Middleton. Pp. xv+415+6 plates. (Johns Hopkins: Baltimore and London, March 1972.) £10.70.

THE Accademia del Cimento of Florence has always fascinated scientists. It existed for very little more than ten years (1657–1667, approximately), and during that period rumours of its devotion to experiment combined with some news of the experiments it performed caused the learned world to await with great eagerness its research report, published in 1667 under the title *Saggi di Naturali Esperienze*, translated by Richard Waller in 1684 as *Essays of Natural Experiments*, "essay" being (correctly) used in its now obsolete sense of "first attempt" or "draft"—Dr Middleton translates the rather troublesome word "Saggi" as "examples". In the event, the scientific world was disappointed in the *Saggi*; the style (by Lorenzo Magalotti) was impeccable, but the experiments themselves had often been rendered out of date by the passage of time. Nevertheless the enterprise remains of interest, for the Accademia del Cimento was a fascinating blend of currents.

The patron and, as it were, President