BOOK REVIEWS

LES ROCHES ALCALINES ET LES CARBONATITES DU KAISERSTUHL, L. VAN WAMBEKE (Euratom), J. W. BRINCK (Euratom), W. DEUTZMANN (Euratom), R. GONFIANTINI (Università di Pisa), A. HUBAUX (Euratom), D. MÉTAIS (Université de la Sorbonne, Paris), P. OMENETTO (Università di Padova), E. TONGIORGI (Università di Pisa), G. VERFAILLIE (Duratom), K. WEBER (Euratom) et W. WIMMENAUER (Geologisches Landesamt, Freiburg i.B.). Publ. No. EUR 1827 d, f, e of Communauté Européenne de l'Energie Atomique—EURATOM, Section Minéralogie-Géochimie, Bruxelles, décembre 1964, 232 pp. 34 fig., 22 microphot., 47 tables, 3 maps. Presses Académiques Européennes, 89, Chaussée de Charleroi, Bruxelles, 6. 350 Belgian francs (~$7.50)

This report, a paperbound volume, brings together several contributions to the geology of the Kaiserstuhl alkaline massif. It presents the results of pure and applied research on alkaline and carbonatite rocks from the Kaiserstuhl area of southern Germany. Because of its broad scope it should interest geochemists, petrologists and mineralogists in addition to others actively engaged in work involving alkaline and carbonatite rocks. The report contains nine papers or chapters dealing with the various research aspects of this study. A brief abstract of the chapters follows.

I Geologisch-Petrographischer Überblick—W. Wimmenauer (also W. Deutzmann, D. Métais, P. Omenetto & K. Weber) (pp. 17–30).

The igneous rocks of the Kaiserstuhl and adjoining France are represented by four distinct families: (1) The olivine nephelinites represent the undifferentiated, highly undersaturated magma. (2) The essexites and theralites occur as subvolcanic intrusions and are believed related to the abundant lavas, agglomerates and tuffs of the area. (3) The phonolites occur as small intrusions and dykes; they alternate in space and time with the essexites. (4) The carbonatites: their emplacement was preceded by subvolcanic breccias. The first and main carbonatite phase is made up of sövite and has associated alvikite dykes. An intermediate brown sövite phase locally separates the first phase from the final barite and rare earth bearing dolomite-ankerite phase.

II Structure des carbonatites de Shelingen—A. Hubaux (pp. 31–35).

Quarries at Shelingen are localized in carbonatites the structure of which is depicted by magnetite-rich bands. Studies of the banding, which varies from concentric to subparallel, lead the author to visualize the

emplacement of the carbonatite as a viscous mass piercing its way upward in a diapir fashion.

III Contribution à l'étude de quelques minéraux des carbonatites du Kaiserstuhl. P. Omenetto et K. Weber (pp. 37–45).

Study of some of the rock-forming minerals. Apatite: occurs with a pronounced acicular habit (1/w 20/1): manganophlogopite (MnO~4.5 per cent, optic and powder *x*-ray data): melilite (chemistry, optic and indexed powder *x*-ray data): olivine, is identified by its optical properties.

IV Erzmikroskopische untersuchungen an gesteinen des Kaiserstuhls Bresgau—W. Deutzmann.

Mineragraphy of oxide, sulphide, titanate and niobiate minerals in the carbonatite (sövite, alvikite, dolomite-ankerite) as well as some silicated rocks and basaltic rocks. Occurrence and relations of pyrochlore, mossite, perovskite (dysanalite), magnetite, ilmenite, hematite as well as various sulphides (molybdenite, galena, bravoite, marcasite, cubanite, valleriite, pyrrhotite, chalcopyrite, bornite, chalcocite, neodigenite, covellite) and gold.

V Géochimie minérale des carbonatites du Kaisersthul—L. Van Wambeke pp. 65–91.

Geochemistry of pyrochlore, perovskite (dysanalite), magnetite, calcite, dolomite, apatite, barite as well as reports of the first finding of columbite, mossite, bastnaesite and monazite in the late dolomite-ankerite carbonatite phase. In addition to the study of simultaneously substituting elements (Ca, Na, Nb, Ti, U, Th, Ta, Zr, *RE*—rare earth elements) in pyrochlore and perovskite, particularly significant is the distribution of Ba, Sr, Fe, Mn and *RE* in the carbonate mineral of successive carbonatite phase. The calcite of the early sövite phase is higher in Ca and Sr and lower in Ba and *RE* than calcite associated with later carbonatite phase. The carbonate in the late dolomite-ankerite phase is typically enriched in Ba, Fe, Mn, Zn, Pb and *RE*.

VI La Géochimie des roches du Kaiserstuhl—L. Van Wambeke (pp. 93–192).

This is the main chapter of the report and deals with the geochemistry of Nb, Ta, Ba, Sr, *RE*, U, Th, Ti, Zr, V, Fe, Mn, Pb, Zn, Ni, Co, Cr, Cu, Rb in the Kaiserstuhl rocks. The trace element work confirms the 4-fold subdivision of the igneous rocks of the district proposed by Wimmenauer (cf. chapter I), brings out the different chemistry of the Kaiserstuhl rocks from that on non-alkaline rocks in general and particularly, the different chemistry (Ba, Sr, Nb, *RE*) of the carbonatite from that of non-metamorphosed and metamorphosed carbonate sedimentary rocks from the district. (Ti, Cu, U, Fe, Ni, Cu, Co) are con-

centrated in the early basic rocks (olivine nephelinites) and (U, Th, Rb, Zr) are concentrated in the more acid differentiates (phonolites) whereas (Ba, Sr, *RE*, Mn, Pb, Zn) are concentrated in the late carbonatite residuals. The chemical data, most of which has been determined by *x*-ray spectroscopy, is available in an appendix and is effectively illustrated by diagrams. A second appendix describes the determination of U and Th in the rocks by gamma ray spectroscopy.

VII La composition isotopiques des carbonatites du Kaiserstuhl—R. Gonfiantini et E. Tongiorgi (pp. 193–200).

A study of the O^{18}/O^{16} and C^{13}/C^{12} distribution in the various carbonatite phases, supports a magmatic origin for the sövite, alvikite and brown carbonatite phases, whereas the barite-bearing dolomites and barite-calcium veins would appear to have formed from a lower temperature hydrothermal stage.

VIII Results of a geochemical soil survey for niobium on the carbonatites of the Kaiserstuhl—by J. W. Brinck (pp. 201–211).

The chromatographic determination of niobium (as Nb_2O_5) in the residual soils and loess deposits over the carbonatites and alluvial deposits derived from these, outlines four anomalies or areas of higher concentration of niobium in the soils. From the results of previous soil survey work in the Kaiserstuhl, the anomalies are interpreted as being caused by underlying carbonatite richer in niobium.

IX Levé géomagnétique en composante verticale du Badberg au Kaiserstuhl—G. Verfaillie (pp. 211–223).

Vertical component magnetometer survey of the Badberg. Because of the highly variable and rough topography the interpretation necessitates that an altitude correction be made on the readings. Carbonatite containing some 11 per cent magnetite causes the anomaly. The tonnage of magnetite causing the anomaly is computed as well as a calculated anomaly based on an assumed cylindrical magnetite body plunging north at 60 degrees.

The report is presented on first quality paper and has only a few typographical errors. An excellent summary in French (Chap. X) reviews and summarizes the results of the whole investigation. The bibliographies are adequate and up-to-date; it is regrettable however that a good geologic map of the Kaiserstuhl is not included in the report. The report would appear a worthwhile acquisition to those interested in carbonatites and alkaline rocks; its cost (approximately $7.50) does not appear too excessive in view of the good presentation and abundant data it contains.

G. POULIOT

THE PHASES OF SILICA, ROBERT B. SOSMAN, Rutgers University Press, New Brunswick, New Jersey, U.S.A. November 8, 1965, $10.00 (U.S.).

This book represents an up-dating of the first portion of the same author's classic work, *The Properties of Silica*, published in 1927. The updated version of the remainder of this work will appear in a later volume. The book is well bound, acceptably printed and not unreasonably priced. The editorial standard appears to be high since the reviewer detected few, if any, typographical errors.

As one would expect from this author, who has been an authority of world-wide reputation in the science and technology of silica and siliceous materials for over half a century, the work is authoritative and comprehensive. It is indeed remarkable that our knowledge of one chemical compound should be so extensive as to fill a 350-page volume. Dr. Sosman adopts a philosophical approach to his herculanean task and has produced a volume that is readable, with numerous human touches in it; it is not merely a cold, austere compilation of the work in this field. In many places, Dr. Sosman, the man, shows through as well as Dr. Sosman, the scientist. This, to the reviewer, was entirely praiseworthy. The author does not scorn to be critical where he feels it to be justified.

The complexity of the work described in this book is wide but logically sub-divided. The idea of including a chapter "The System SiO_2-H_2O" in a volume otherwise devoted to the one compound silica was good inasmuch as the hydrated forms of silica are intimately related to the anhydrous forms, since water is involved as a vehicle in many of the phase inter-conversions that silica undergoes.

The book will be a useful work of reference to the scientist working in this field, whether he is a chemist, a mineralogist, a crystallographer, a geologist or a metallurgist. One is led to hope that Dr. Sosman, already advanced in years, will be spared to complete the revision of his earlier work and thus put the seal to a lifetime of monumental scientific endeavour.

NORMAN F. H. BRIGHT