H. G. Thode presents more data on sulphur isotopes in meteorites and in basic sills and other igneous intrusions. The meteoritic ratio of S^{32}/S^{34} is discussed as a standard for sulphur isotope measurements and as a possible base level from which fractionation of sulphur isotopes in the crust began. Further work on the pattern of isotope changes in the sea during geological time may provide correlations with major biological and geological activity.

R. N. Clayton's paper is essentially a short review of oxygen isotope thermometry. The original application of this principle by Urey and co-workers to sedimentary rocks and fossils is discussed, together with current research towards an extension of the method to higher temperature igneous and metamorphic rocks.

M. Fleischer and W. O. Robinson's contribution is an abridgement of a review of fluorine geochemistry prepared for the U.S. Public Health Service. New arithmetic averages for the fluorine content of crustal materials are presented. The distribution of fluorine in ground waters in the United States is presented on a map (Fig. 3), which is of little value due to poor quality reproduction.

E. H. T. Whitten's paper is a survey of the sampling problems in obtaining reliable quantitative compositional data within granite complexes. Simple contour maps of elements or ratios of elements may be subjectively biased by impressions gained in the field or preconceived ideas. The author describes the use of two- and three-dimensional variation analyses in studies of palimpsest ghost stratigraphy in granite complexes, compositional variations, and problems of the origin of granite.

G. V. Middleton presents a non-mathematical account of statistical problems in geochemistry. More sophisticated techniques are required and multivariate analysis, by condensing the data to a more manageable form, reveals relationships between groups of variables not evident from simple graphical analysis. T. W. Bloxam

Gay (R.). *Cours de Cristallographie. Livre III. Radiocristallographie théorique.* Paris (Gauthier-Villars et C^ie^, 55 Quai des Grands-Augustins) 1961. 278 pp., 105 figs. Price, bound: 38 NF.

The book is divided into 3 parts and each part is further subdivided into 10, 4, and 2 chapters respectively. Part 3 deals only with the powder method, while parts 1 and 2 aim to deal with all the mathematical and geometrical representation including structure determination. The number of pages is of course insufficient to deal with the subject adequately, which is perhaps the reason why the contents

appear to be unbalanced and not represented as well as they might have been. Almost a third of the book is devoted to the powder method, which must be relatively simple to understand compared with the knowledge necessary to carry out single-crystal work and complete structure determination. The text is amply illustrated by line drawings but these are not always very clear, or easy to follow. On the whole one is left with the impression that this book does not reach the standard of the textbooks on the subject published in English and German during the last few years. R. J. D.

BRAUNS (R.). *Allgemeine Mineralogie.* 11th edn, revised by KARL F. CHUDOBA. Sammlung Göschen, Bd. 29/29a. Berlin (Walter de Gruyter & Co.), 1963. 152 pp., 143 text-figs. Price: DM. 5.80.

BUCHWALD (EBERHARD). *Einführung in die Kristalloptik.* 5th revised edn. Sammlung Göschen, Bd. 619/619a. Berlin (Walter de Gruyter & Co.), 1963. 128 pp., 117 text-figs. Price: DM. 5.80.

Prof. Brauns's well-known little textbook evidently retains its popularity, and this edition is 32 pages longer than the 10th (1958, see Min. Mag. **32**–260), mainly by the inclusion of a short account of crystal optics. In these days of rocketing prices, the production of this enlarged edition at the same price as the 10th is an achievement.

Prof. Buchwald's treatment of crystal optics is clear and concise, while being remarkably thorough in coverage. It is, however, based on the wave-normal surface, which makes the development less easily followed than the treatment based on the indicatrix that is usual in this country. On the other hand, the treatment of rotary polarization is unusually full and clear, and room has been found for a short account of the Ewald-Born Kristallgitteroptik. M. H. H.

CAILLÈRE (S.) and HÉNIN (S.). *Minéralogie des Argiles.* Paris (Masson et C^ie.), 1963. 355 pp.

This book is published simultaneously with a complementary volume *Geology of Clays* by G. Millot. The subject is treated comprehensively, beginning at a level suitable for the undergraduate but not omitting the most recent contributions. About half the book is devoted to experimental methods and crystal structure, and half to detailed descriptions of the clay mineral types. The authors, founder members of the Groupe français des Argiles, are familiar to most members of the Society, and the book is of the high standard that would be expected of such distinguished writers. Extensive reference is made to the publications