tion spectrometer than to space-group theory. Modern apparatus, techniques and methods find no mention.

Similar criticisms apply to the new material on crystal physics. It is undoubtedly important that the student should realize that optical properties are not the only physical properties of crystals to have been studied, but it is questionable whether an account of the other properties as brief as that given here serves any very useful purpose: elasticity, plasticity, cleavage, hardness, thermal and electrical conductivity, thermal expansion, pyro- and piezo-electricity, magnetic properties and density are all discussed in 50 pages. Again, modern work is largely ignored, and the reader will find here little that is not also to be found in Liebisch's *Physikalische Krystallographie* published in 1891.

The printing and binding are excellent, and the illustrations are beautifully drawn and reproduced. As with so many works in the German language, the price is regrettably high for an elementary text-book presumably intended to have a wide appeal.

R. C. EVANS

Department of Mineralogy and Petrology
Cambridge, England

Mineralogische Tabellen. Eine Klassifizierung der Mineralien auf kristallchemischer Grundlage, mit einer Einführung in die Kristallchemie. By Hugo STRUNZ. 3rd. edition. Pp. viii+448. with 70 figs. and 2 folding tables. Leipzig: Akademische Verlagsgesellschaft Geest and Portig K.-G. 1957. Price bound DM. 34·00.

For more than 20 years Dr Strunz, now professor at the Technical University in Berlin, has worked relentlessly towards building a classification of minerals based on crystal chemistry; the first edition of this book appeared in 1941, the second in 1949. A sketchy introduction touches on the high spots of crystallographic results and includes a selection of crystal structures of various types, carefully described and discussed, with good standard drawings. The systematic part of the book gives, for each species (whenever possible): name, formula, space group, cell dimensions, axial ratios, and number of formula units per cell. If crystal data are incomplete, the status of the mineral is briefly analyzed. Structural relationships between species are brought out.

In its broad features the classification remains unchanged in this 3rd edition: minerals are divided into nine chemical classes. The reader will not fail to notice a laudable effort towards more rigor in the definitions of such fundamental mineralogical concepts as species, variety, series (isotypic and isomorphous), and groups (homeotypic and heterotypic). The number of pages has increased from 308 to 448. There is more on each page too, as many figures, formerly flanked by empty space, are now surrounded by printed matter. As a result the content of the book is nearly doubled. Each of the nine classes of minerals is treated in a separate chapter, which is now headed by a synoptic tabulation of names and formulae. About 230 new minerals have been added; for some 400 minerals new data on cell or structure have been incorporated, and all references to original sources have

been given in footnotes. All cell edges are now expressed in Å ('metric Å'). The new, somewhat expanded, international space-group symbols of 1952 replace the former Hermann–Mauguin symbols of 1935, next to Schoenflies symbols.

Considerable reworking of the text, both as to substance and as to form, is observable throughout the book. Two new folding tables, which summarize the classifications of layer silicates and of feldspars, are particularly welcome. Increased emphasis is placed on ionic radii (Goldschmidt's, Pauling's, and Ahrens' data), now listed in a special table for the various valence states of the elements. It is gratifying to note that the revised presentation not only adds, but also judiciously leaves out, for the sake of greater unity, irrelevant material previously included, such as morphological or optical data and some of Niggli's concepts. An occasional omission, however, will probably be regrettet by some—the latest chains of tetrahedra, for instance, although duly mentioned in the wollastonite group, have not been introduced in the description of the structural types of silicates—but it is difficult to please everybody! The Index has now reached the impressive total of 6220 mineral names, some 2400 of which, printed in bold face, are discussed in the text, and comprises about 1520 species, 400 varieties, 280 synonyms and over 200 ill-defined terms; the remaining 3800 terms are of the superfluous kind. Finally a 20-page index of chemical formulae is a useful innovation. Some simplifications in the typography, a sturdy cloth binding, and a gold-lettered cover make the new volume look better than its predecessors.

No mineralogist, whether or not he owns the first two editions, can afford to do without this one.

J. D. H. DONNAY

Crystallographic Laboratory
The Johns Hopkins University
Baltimore 18, Maryland, U.S.A.

GABRIELLE DONNAY

Geophysical Laboratory
Carnegie Institution of Washington
Washington 8, D.C., U.S.A.

Einführung in die Vektorrechnung. By HUGO SIRK. D. Steinkopff Verlag, Darmstadt. 1958. 124 pages; price DM. 16.–

In this Introduction to Vectors for second year science students the vectorial operations are discussed together with pertinent physical applications. Crystallographic concepts, like those of lattice, reciprocal lattice, Miller indices, Laue and Bragg conditions of enhancement, sphere of reflection are used to illustrate vector algebra at various stages. For vector analysis the electromagnetic and hydrodynamical fields serve a similar purpose. The booklet is neither intensive nor extensive in what it brings, it is, however, most likely useful for the students at the University of Vienna in conjunction with their other courses which it helps to integrate. One of its virtues is its brevity.

P. P. EWALD

Polytechnic Institute of Brooklyn
Brooklyn 1, N.Y., U.S.A.