the formation of muscovite and sericite from impure limestones. Wollastonite, garnet, magnetite, epidote, and graphite are formed by a greater degree of metamorphism. In contact metamorphism some of the material for the formation of new minerals is supplied by the igneous rock.

Mr. Radu demonstrated the phosphorescence of a synthetic ruby after exposure to ultra-violet light, by means of a new device permitting the detection of a very short period of phosphorescence.

Mr. Weidhaas exhibited chalcedony from Tampa and Biscayne Bays, Florida.

HORACE R. BLANK, *Secretary*

REVIEWS

THE PHYSICS OF CRYSTALS. ABRAM F. JOFFÉ. Edited by Leonard B. Loeb. XI+198 pages, 61 figures. McGraw-Hill Book Co., *New York*. **1928.**

Dr. Joffé presents in this book a series of lectures given at the University of California and edited by L. B. Loeb, Professor of Physics at California. Although the subject matter is clearly designed for the technical physicist yet there are many valuable crumbs for the mineralogist and geologist.

The lectures include a liberal amount of discussion of experimental work which has been done during the last twenty-five years by the author and his collaborators. The experiments include various types of deformation of crystals and the detailed study of results especially by the X-ray method. The analysis of these results is of exceptional interest to the geologist with its bearing on geologic stresses as expressed in the formation of schist minerals, minerals growing in fractures and their strength, etc. I recommend to any mineralogist the following four chapters: The elastic after effect; The elastic limit; The mechanism of plastic deformation; Strength.

The last part of the book is somewhat mathematical and deals with a phase of crystal physics which is still in advance of most of our application. It includes the electrical and associated effects which ultimately must command our attention but which most of us are still willing to see further advanced by the physicist before we can hope for any large degree of successful application.

The book is worthy of our most serious attention. It covers a phase of the subject that the mineralogist is seldom qualified to enter, but one that he cannot afford to neglect.

R. C. EMMONS

EINFÜHRUNG IN DIE KRISTALLSTRUKTURLEHRE. FERDINAND VON WOLFF. 169 pages, 119 figures. Quelle & Meyer, Leipzig. **1928.**

This book according to the title is an introduction to the study of crystal structure. More properly speaking it is a synopsis of the entire field of crystal structure. To the mineralogist, however, who does not want to study the details of crystal structure analysis, it supplies a long-felt need.

The illustrations, so important in this science, are especially well chosen and unusually clear. The binding and printing of the volume are very good. Chapter I (16 pages) deals with the 32 crystal classes. It assumes that the student is familiar with crystallography. Since this cannot be expected of chemists, metallurgists, and others, the author could have dwelt at greater length on this subject. Chapter II

(34 pages) gives a good account of the 230 space groups and the 14 Bravais lattices, but the author omits almost entirely the point groups and their relationship to the lattices and space groups. Chapters III and IV contain very short discussions on the theory and production of X-rays and X-ray diffraction. The methods of crystal analysis are described in a few pages. This brevity is rather serious as whole paragraphs become unintelligible to the reader unless he has become familiar with the methods elsewhere. In Chapter V we read of the properties of the elements and the structures of atoms. The next two chapters occupy 50 pages and deal with the various crystal structure types thus far discovered. They follow very closely V. M. Goldschmidt's classification and discussion of structure types and atomic and ionic radii. Even the structure of olivine is included, but no account is given of any organic crystals. The last chapter takes up isomorphism, morphotropism, polymorphism, etc. A bibliography for the years 1924 to 1927 concludes the book. Unfortunately an alphabetical index was omitted which detracts from the value of the volume. Several typographical errors were noticed in the last third of the book.

JOHN W. GRUNER

NEUE MIKROSKOPISCHE BEOBACHTUNGEN AM CUBANIT (CHALMERSIT) UND ÜBERLEGUNGEN ÜBER SEINE LAGERSTÄTTENKUNDLICHE STELLUNG. PAUL RAMDOHR. *Zeitsh. f. praktische Geol.*, vol. **36,** 1928, pp. 169–178.

A great deal of information including a complete bibliography on cubanite may be found in this paper. The author himself studied 32 occurrences of cubanite and finds that the mineral once considered as rare is very common in pyrrhotite-chalcopyrite ores, though he cannot explain its absence in many ores of apparently the same type. The crystallographic orientation of cubanite lamellae in chalcopyrite is carefully described. Its optical properties including pleochroism and behavior in reflected polarized light are given. The name cubanite (chalmersite) seems to include two minerals which the author calls cubanite 1 and cubanite 2. The latter seems to be a decomposition product of cubanite 1, which appears to be the true cubanite. Cubanite 2 can be distinguished from cubanite 1 by optical tests and then only by very careful study since they appear almost identical. In polarized light cubanite 2 is darker brown ("lederbraun") than cubanite 1 and remains this color on rotation of the stage, while cubanite 1 shows considerable anisotropism.

Cubanite seems to be confined to deposits formed at high temperatures, an observation in complete agreement with G. M. Schwartz's experiments (*Econ. Geol.*, vol. **22,** 1927, p. 44). The occurrence of peculiar little stars (skeleton crystals) of sphalerite in chalcopyrite and cubanite is described.

JOHN W. GRUNER

NOTES AND NEWS

Dr. E. L. Bruce, professor of Mineralogy at Queen's University since 1920, has been appointed first Miller Memorial Professor of Research at Queen's University. The new chair has been founded by friends and students of the late Dr. Miller and by mining companies in northern Canada.

Professor J. E. Hawley, of the University of Wisconsin, has been appointed head of the department of Mineralogy at Queen's University. He is a graduate of Queen's University and succeeds Professor E. L. Bruce.