following minerals: (a) rutile, two or three grains; (b) quartz; (c) tetradymite; (d) chalcopyrite, one or two very small grains; (e) a black mineral occurring in minute specks in the tetradymite, not as yet positively identified, but may be tenorite; (f) bismutite. Paragenesis: rutile, quartz, tetradymite, chalcopyrite, tenorite (?), bismutite.

The specimens were found in a brecciated quartz vein about four inches wide, in an open cut prospect in the quartz monzonite of the Inyo Mountains.

Dana[2] mentions tetradymite from but six states, and none of these localities are in California. However, Eakle[3] lists two occurrences in California (reported by Hanks[4]), and one other unconfirmed occurrence.

[2] *Textbook of Mineralogy*, 4th edition, p. 412, **1932.**
[3] *Op. cit.*, p. 64, 1923.
[4] *4th Ann. Rept. State Mineralogist*, **1884.**

ON THE APPLICATION OF DETERMINANTS TO CRYSTALLOGRAPHY

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The American Mineralogist published in its issue of December 1934 (vol. **19**, no. 12) a very interesting study by J. D. H. Donnay on "The theory of determinants applied to crystallography." It does not appear from the article whether the author considers the application of determinants to crystallography as something new or not; in any case the author does not mention anything to that effect.

I wish therefore to make it clear that priority, in this field, belongs to the Italian mineralogist Quintino Sella, who in the Notes A and B to his paper "Sul boro adamantino,"[1] submitted to the Academy of Sciences of Turin on the 14th of June 1857, and printed in 1858, showed that "the principal formulas of crystallography can be symbolically presented by means of the notations introduced by modern analysts in the calculus of determinants in a manner which is both concise and elegant."

The first problem treated by Sella, with the use of determinants,

[1] *Mem. R. Acc. delle Scienze di Torino*, Ser. 2, tomo **XVII,** Torino, 1858. Reprinted in "Memorie di cristallografia di Quintino Sella," *Mem. R. Acc. Lincei, Cl. di Sc. fis; mat, e nat.*, vol. **II,** Roma, 1885.

is precisely the first of those mentioned also by Donnay, that is, the condition which relates the indices of three faces in a zone. Subsequent to Sella's application of determinants to crystallography, the same method has been followed in Italy to the present day, in nearly all university courses of mineralogy, and in some treatises on morphologic crystallography.[2]

[2] For instance; R. Panebianco, *Trattato di cristallografia morfologica*, Padova, 1904.

PROCEEDINGS OF SOCIETIES

PHILADELPHIA MINERALOGICAL SOCIETY

Academy of Natural Sciences of Philadelphia, February 7, 1935.

Dr. Gillson presided at a stated meeting, 51 members and 35 visitors being present. Dr. Gillson spoke on "Some Mining Operations in England, Spain, and Sierra Leone." The lecture was illustrated by means of lantern slides. During 1935 he spent ten days at Cornwall, a month at Cologne, Germany, a week in Spain, and six weeks in Sierra Leone. The history and development of the tin mines of Cornwall were described, also the geologic origin of the deposits, and the financial difficulties of the various companies operating the mines. He visited the mercury mine at Almaden, which has been in operation since 1499, and produces ore averaging 7% quicksilver. Spain is also an important potash producer, a typical salt dome being located near Barcelona and Cardona. Sylvite and carnallite occur on the flanks of the dome. Dr. Gillson went to Sierra Leone to examine ilmenite deposits. The deposits are not commercially important and Sierra Leone, thought to be insignificant mineralogically, has been brought to our attention by Pollet, who has found deposits of diamond, gold, chromite, and platinum. At Marampa, 45 miles from the coast, there is an iron ore deposit estimated to contain 100,000,000 tons.

W. H. Flack, *Secretary*

BOOK REVIEWS

EDELSTEINE UND SCHMUCKSTEINE. Dr. Alfred Eppler. Second edition, revised and enlarged by Dr. W. Fr. Eppler. 554 pages, 317 illustrations, and 4 colored plates. Wilhelm Diebener, Leipzig, Germany. **1934.**

This revision of the well-known Eppler text, first issued in 1912, is especially designed for gem dealers, jewelers, artists, collectors, and admirers of gem stones. Written in the environment of Idar, Germany, the historic center of the gem-cutting industry, the author has been able to draw upon the long experience and great wealth of material of the community. This edition is a very welcome, as well as an important contribution to the literature of gem stones.

The nine chapters of the book are devoted to the following topics: Historical Survey of the Use of Gems; Chemical and Physical Properties and the Usual Methods for the Recognition and Determination of Ornamental and Gem Stones; Imita-