Vienna, he visited the zeolite localities of Scotland and the Faroe Islands. Later, he became interested in more general problems, one of which was the cause of the peculiar blue colour of rock-salt, and it was in this mineral that he discovered the phenomenon of piezo-pleochroism. More recently, he turned his whole attention, day and night, to the study of the colloidal forms of minerals, which appear to be of some importance in the products of weathering and in soils.

Hans Christian Albert Hauswaldt.

Dr. Hans Hauswaldt, a counsellor of commerce (Kommerzienrat) of Magdeburg, died on March 27, 1909. He possessed a private laboratory well equipped with instruments, in which he obtained a large number of beautiful photographs of the optical interference-phenomena of crystals and photo-micrographs illustrating various kinds of crystalline structure. Many of these photographs were published in his work 'Interferenz-Erscheinungen an doppeltbrechenden Krystallplatten im konvergenten polarisirten Licht' (Magdeburg: J. G. Hauswaldt, 1902, 1904, and 1907), the three portfolios of which contain a total of 185 magnificent quarto plates reproduced in black and white. In a posthumous publication, in conjunction with D. Vorländer, is given a series of nineteen plates of the interference-figures shown by liquid crystals (Abh. Leop. Carol. Akad. Halle, 1909, vol. xc).

REVIEWS.

Crystallography, an elementary manual for the laboratory. By Professor M. Edward Wadsworth. Pp. xvi [+ xx] + 299, with 25 double plates. (Philadelphia: J. J. McVey. 1909. Price $3.00).

This book is intended to give to students of geology and mining, as well as to prospectors, an idea of the forms of crystals, which will be of assistance to them in the determination of minerals in the field or laboratory. The detailed description of the forms of the six systems commences at p. 9 with the triclinic system, and ends at p. 147 with the isometric system. The student is then taken through the whole of this again three times in the succeeding chapters headed 'Crystallographic

symmetry', 'The thirty-two classes of crystals', and 'Crystallographic nomenclature'.

Much prominence is given (in heavy type) to the names of the different simple forms, and little is said of combinations of forms. The notations used include those of Weiss, Naumann, Dana, and Miller; the last being referred to as 'the Whewell-Grassman-Miller system as modified by Bravais'. There are very many points open to criticism. For example, in the triclinic system there is a confusion between hemi-prisms or hemi-domes and hemihedral forms; and it is quite incorrect to speak of tetartohedral forms in this system. Again, it is difficult to understand how a basal plane can be described as a 'vertical pinacoid'.

The numerous figures (612 in number), instead of being conveniently placed in their appropriate places in the text, are printed on flimsy paper and placed together towards the end of the volume; and reference to them is a matter of some difficulty. The detailed explanations of these plates occupy 59 pages of text. This arrangement is alone sufficient to prevent the book being recommended to students; and we cannot imagine that it will find much circulation outside the author's own classes.

Reviews of books very frequently end with a complaint of the paucity of the index. Here, however, we find an index extending over 35 pages, and we must confess that we have found this the most interesting (not to say amusing) portion of the volume. In one place in the text casual reference is made to emigrants from Russia, Poland, and Bohemia; in another place William Shakespeare, Ben Johnson [*sic*], Frederick Barbarossa, &c., are given as examples of binomial names: all these appear in the index, and the last of them under F. The long lists of the positive and negative forms of crystals are each allotted over a page; while under the index-entry 'Type, Nephelite' there are no less than eleven page-references, but there is no mention of the subject on most of the pages so quoted.

Das Radium und die Farben. Einwirkung des Radiums und ultravioletter Strahlen auf organische und anorganische Stoffe sowie auf Mineralien. By Professor C. DOELTER. Pp. viii + 133. (Dresden: Theodor Steinkopff. 1910. Price 4 Marks, bound 5 Marks.)

The author has carefully collected a vast number of isolated facts, to be found scattered through scientific literature, respecting the changes in colour which minerals and various artificial substances undergo when they are exposed to the action of radiations of various kinds, including

ultra-violet rays, cathode rays, Röntgen rays, and the rays emitted by radium salts. To these he adds numerous observations of his own on a great variety of substances, and the results of experiments made by heating coloured materials in an atmosphere of oxygen, nitrogen, or carbon dioxide.

By simply allowing a substance to remain close to radium chloride for a few weeks or months marked changes in colour are frequently to be observed. For example, fluor-spar which has previously been decolorized by heating to a temperature of about 220° C., becomes bluish-green or sometimes bluish-violet; this colour gradually disappears after a few days, even if the specimen be kept in the dark. Most blue sapphires are soon changed to yellow or yellowish-brown under the influence of radium-rays: and the original blue colour may be restored by exposure to ultra-violet rays. Colourless topaz is changed to orange-yellow by the radium-rays; and many other gem-stones are affected, though not the artificially produced ruby and sapphire.

Such changes as these are discussed in connexion with the general and very complex subject of the coloration of minerals, but it is evident that much more work requires to be done before any far-reaching conclusions can be drawn. The mysterious and especially interesting case of the blue coloration of rock-salt is considered at some length.

Spark spectra of the metals. By CHARLES E. GISSING, Rear-Admiral R.N. (retired). Pp. vii + 21, with 12 plates. 4to. (London: Baillière, Tindall and Cox. 1910. Price 7*s.* 6*d.* net.)

In a series of fifty black and white photographic reproductions, each six inches in length, are given the characteristic spark-spectra of the metals and of a few other elements. Tables of the wave-lengths of the principal lines are given, and a brief description of the apparatus used by the author is added. The illustrations and tables are intended to help in the identification of the metals present when metallic ores are examined by this method; but no examples are given of the spark-spectra of actual minerals. That this method may be of some value in the examination of minerals has been proved by the researches of W. N. Hartley and H. Ramage, and of the Comte A. de Gramont.