

called elliptic compensator, in which the plate is rotated in its own plane above the specimen (in the  $45^\circ$  position) until the position of minimum intensity of the transmitted light has been found. In the chapter on the universal stage there is no direct mention of the need to correct measured angles of rotation about horizontal axes for the difference between the refractive index of the hemispheres and the mean refractive index of the mineral. A somewhat oblique reference to this point is made on p. 121 in describing the measurement of  $2V$  on muscovite, but even here it is envisaged that the refractive index of the hemispheres might not be known. In the reviewer's experience this information is always engraved by the makers on the hemisphere mounts, and accurate work with the universal stage would be impossible without it. In the same chapter, glycerine is recommended as a liquid for making contacts between the hemispheres and the preparation. Glycerine has an undesirably low refractive index for this purpose, and, particularly if it were used with hemispheres of high index, would cause total reflection to occur at angles of tilt smaller than the maximum allowed by the geometry of the apparatus.

The fundamental difference between orthoscopic and conoscopic observations is not made very clear. Fig. 2-7, which aims to show the ray paths in the two cases, is unaccompanied by any explanation which would help the reader to trace the rays. In any event it is hardly possible to do so with the naked eye, since the drawings are on far too small a scale, and much inferior for their purpose to Figs. 7 and 8 in the second edition, which they have replaced. One seeks in vain for a simple and direct statement such as that, from the standpoint of geometrical optics, each point in the orthoscopic image is formed by the focusing of rays which have emanated from a point in the object, whereas each point in the conoscopic image is formed by the focusing of rays which have passed through the object in a particular direction.

The conditions of correct illumination are outlined on pp. 15-17, but no practical instructions are given as to how these conditions are in fact established with any of the microscopes and lamps which are described. The fact that the conditions of illumination needed for the maximum resolution of object detail conflict with those required for the study of optical properties in 'parallel' light is not emphasized. Finally, the recommended use of the concave side of the mirror in *high-power* work would not find favour with many microscopists. The concave mirror introduces astigmatism into the image of the light source formed by the condenser, and thus defeats the object of using a highly corrected condenser in work in which the resolution of object detail is important. Its use is best confined to low-power work, either for increasing the size of the image of the light source cast by the condenser so that the field may be filled, or for giving a weakly convergent illuminating beam in the absence of a condenser.

These criticisms are not offered in any carping spirit, but in the hope that future editions of this work, which is a mine of useful information on mineral optics, may be free from these less felicitous passages. Although their enumeration has occupied some space in this review, they constitute only a small fraction of the content of the book, and are not such as seriously to detract from its value.

The production of the book is of the high standard which we have learnt to expect from the firm of McGraw-Hill. The reproduction of the photomicrographs in particular merits commendation; they are almost as clear as originals.

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## Books Received

*The undermentioned works have been received by the Editors. Mention here does not preclude review at a later date.*

**Elektronenmikroskopische Untersuchungs- und Präparationsmethoden.** By L. REIMER. Pp. viii+300 with many figs. Berlin: Springer Verlag. 1959. Price 58 DM.

**Structure and Change. An Introduction to the Science of Matter.** By G. S. CHRISTIANSEN and PAUL H. GARRETT. Pp. xvi+487 figs. San Francisco and London: Freeman and Co. Ltd. 1960. Price 63*sh.*

**X-ray Powder Photography in Inorganic Chemistry.** By R. W. M. D'EYE and E. WAIT. Pp. viii+222. London: Butterworths Scientific Publications. 1960. Price 45*sh.*

**Les Traceurs Radioactifs en Métallurgie Physique.** By C. LEYMONIE. Pp. 240 with 43 figs. Paris: Dunod. 1960. Price 32 NF.

**Cours de Cristallographie.** Livre II. Cristallographie Physico-Chimique. By R. GAY. Pp. 232 with 151 figs. Paris: Gauthier-Villars. 1959. Price \$6-17.

**Crystal Chemistry of Simple Compounds of Uranium, Thorium, Plutonium and Neptunium.** By E. S. MAKAROV. Pp. 145. New York: Consultants Bureau, Inc. 1959. Price 42*sh.*

**Crystals and Crystal Growing.** By ALLAN HOLDEN and PHYLLIS SINGER. Pp. 320+137 figs. and 49 plates (7 in colour). New York: Doubleday and Co., Inc. 1960. Price \$1-45.