

conciseness it assumes a mathematical training which many of them have never had, and which is much more difficult to acquire even than a knowledge of continued fractions. In some measure, no doubt, it is they who are at fault, and certainly they are the losers.

Such criticism is, obviously, to some extent beside the mark. But it recurs inevitably with the appearance of each fresh Cambridge text-book on geometrical optics. An excellent book; but if only the author had written something which would more obviously advance the practice of optics and the manufacture of optical instruments!

To our mind, the most interesting part of this admirable little tract is contained in sections ix. and x. Section ix. gives a simple and concise explanation of the occurrence and physical importance of von Seidel's five third-order aberrations, very palatable and nutritious for the mathematician! And in section x. is to be found an up-to-date abstract of the elementary theory of the characteristic function, which will be helpful to many. The contents of the tract will have been sufficiently indicated if we add that the titles of sections vii. and viii. are respectively "Entrance and Exit Pupils" and "Chromatic Defects of the Image."

In conclusion, we venture to assert that Mr. Leatham's exposition of the Gauss theory will be adopted as the most serviceable by every optician who takes the trouble to become familiar with this book, and we would add that he will find his trouble well repaid.

*Hints for Crystal Drawing.* By Margaret Reeks.

With a preface by Dr. John W. Evans. Pp. xx+148; with 5 figures and 44 plates. (London: Longmans, Green and Co., 1908.) Price 3s. 6d. net.

The importance of accurate drawings of crystals in any crystallographical discussion was recognised by Häuy, the father of crystallography, but the principles upon which such drawings should be made were not clearly explained until the publication by Haidinger of his well-known paper among the memoirs of the Wernerian Society many years later. It is essential that edges which are parallel on the crystal should be represented by parallel lines on the drawing, a condition which entails the supposition that the eye views the crystal from an infinite distance. Consequently, in such a special case as a skeletal cube in which the edges are drawn of equal thickness, the eye would be puzzled as to which is the front, and the cube would appear constantly to be turning inside out; but, as a rule, no such ambiguity would arise. It is also important that the directions of the edges in the drawing should be determined with mathematical precision, even when the crystal is shown in perspective.

In this book Miss Reeks presents Naumann's modification of Haidinger's method. She explains how the projection of the fundamental axial system may be found graphically in the six different systems, and discusses many examples, all of which are illustrated by full working details. It might have been made clearer on p. 7 that the particular rotations employed to give the customary perspective were adopted, not haphazardly, but because the tangents of the angles have the simple ratios given. The student who carefully reads this book cannot fail to master the principles of the method with which it deals; the author's exposition is lucid, and the illustrations, which have been reproduced from her own drawings, are admirable. It may, however, be questioned whether in most cases it be not quicker and easier to draw a

crystal from a stereographic or a gnomonic projection by the method devised by Goldschmidt, which was fully explained to English readers by Penfield in one of his illuminating papers.

*House-painting, Glazing, Paper-hanging, and White-washing.* A Book for the Householder. By A. H. Sabin. Pp. v+121. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1908.) Price 4s. 6d. net.

MR. SABIN may be known to some readers of NATURE as the author of a pleasantly discursive volume on the technology of paint and varnish. In the present little work he expounds one branch of that technology for the benefit of householders. He describes simply and plainly how to use various preservative coatings in the protection and embellishment of ordinary dwelling-houses.

There is no chemistry in the book, but a chemist tells of the materials to use—of the white lead, turpentine, oil, driers, putty, varnish, and whitewash—as also of the points to note and the pitfalls to avoid in applying the preparations. Whether many householders will benefit is perhaps doubtful. Possibly, in America, where isolated homesteads are more frequent, the householder may be more often than in this country tempted to do his own painting and papering. Here it would rarely seem worth while. There is a proverb about spoiling a horn and not making a spoon, and probably the unskilled user of paint, paper, and varnish would generally do well to get his work done better by a trained craftsman. Even so, however, there is no harm in knowing what are the best materials, how to get the most durable results, and the general why and wherefore of the matter. For anyone who contemplates either trying his own skill or overlooking the proceedings of a workman, Mr. Sabin's book appears, as he claims in the preface, to "set forth fairly safe and sound practice."

C. S.

*Mountain Panoramas from the Pamirs and Kuen Lun.* Photographed and annotated by Dr. M. Aurel Stein. Pp. 36. (London: Royal Geographical Society, 1908.)

WHEN Dr. Stein visited Central Asia in 1900-1, to explore the ruined cities of Chinese Turkestan, he included in his equipment a phototherodolite, with which a number of panoramas were taken. These not only served as a basis for the production of a map, but gave an excellent idea of the character of the country passed through. The Royal Geographical Society has now published a selection from them which will prove of interest to both geographers and geologists. A feature common to a large number of the photographs is the manner in which they illustrate the progressive desiccation of the region lying north of the Himalayas; the sharp crested ridges, separating deeply-cut valleys, produced by the action of rain and rivers, are seen to be gradually merging into rounded contours under a growing mantle of wind-borne loess. We may also direct attention to the remarkably perfect specimens of embankment moraines in the Ab-i-Panja valley, where glaciers, now vanished, have advanced into the main valley over embankments of the *débris* which they have carried along with them.

*Thomas Linacre.* By Dr. William Osler, F.R.S. Pp. vi+64. (Cambridge: The University Press, 1908.) Price 2s. 6d. net.

THIS little volume is the text of the Linacre lecture for 1908, the first under the new regulations. Prof. Osler begins by recapitulating the few facts