

inner region of quartz in which the three colour sectors adjacent to the three of the rhombohedral faces are clearly seen. Fig. 3 (b) is a picture of an entire small crystal of amethyst immersed in benzyl alcohol and viewed transversely by sodium light. Regions of colourless

and coloured quartz are clearly seen in the picture, separated from one another by a sharply defined boundary which carries a dark deposit of ferric oxide.

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PRINCIPLES OF OPTICAL ENGINEERING*

IN unravelling the mysteries of both the atomic and the astronomical worlds, no branch of physics has played a greater role than optics. But for the development in precision optical technique which has enabled the construction of spectrographs, microscopes and telescopes, our knowledge of the physical world would not have been what it is. The optical instrument, instead of being merely a laboratory appliance, has crept into the field of mechanical engineering where the highest precision is attained only by optical devices. In aerial surveying, in accurate artillery, in fine art photography, in cinematography, in biological investigations, and in a variety of branches of human activity, optical equipment is becoming more and more predominant. From all aspects of scientific advancement, there is an increasing demand not only for a larger and larger number of new optical components, but also for improved techniques in the attainment of greater perfection in the production of these components.

It is however surprising that the literature on such an important subject as optical workshop technique is so meagre. This is probably due to the fact that manufacturers in this line were reluctant to part with their technical secrets.

The foremost in the field to get out of this traditional reticence was Charles Deve with the publication of his classical work "Travail des Verres d'optique de Precision" in 1938. The book was written with a double purpose—firstly, as a text for trainees in optical workshop principles and, secondly, as a book of reference for works managers and senior workmen. This treatise was found to be of such importance, that two more editions were brought out even during the most difficult conditions of World War II. M/s. Adam Hilger got it translated into English, and the volume under review is the second English edition of the book published by them.

From the fundamental notions of glasses and their faults, of abrasives and their gradations, of tools and their proper uses, to the most difficult art of obtaining and testing of optical components of the highest precision, the book covers the entire range of the technique of workshop optics. Deve has, for the first time, developed a coherent theory of surfacing, from which he deduces rules for workshop procedure, a practice which has been hitherto based merely on experiment and experience. It is this theory that enabled solution of a number of unsolved optical problems including the very complicated production of perfect cylindrical surfaces. In this work, precision optical technique, which was considered to be an art and a monopoly of the gifted few, is developed and treated as a scientific subject and made available to all who choose to take to this line. All aspects of manufacture of optical components including grinding, polishing, centering and edging, as well as of the allied aspects of cementing and metallising are treated in a clear and lucid manner.

An important addition in this edition of the book is the production of aspherical surfaces and contact lenses, achievements which were outstanding for generations. There is no aspect of the subject that is not dealt with, excepting that of the treatment of crystals, the technique of which could have been described in greater detail. Probably that was not in Deve's line of work, nor was he spared to live to contribute to the latest developments in this.

In the words of Ch. Fabry, who was Deve's patron and guide, "the working optician, as well as the apprentice, the foreman and the technical directors will find in this book ample matter for self-instruction and although they find difficulty in properly assimilating certain parts, will be well repaid for their pains, by a more complete understanding of a difficult art, one of the most beautiful that there is".

Hilgers have done a distinct service to the English-knowing scientists by bringing out this translation, which is a faithful reproduction of the original.

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* *Optical Workshop Principles*. By Charles Deve. 2nd English Edition. Translated by T. L. Tippcell. (Hilger and Watts Ltd.), 1954. Pp. xxiv+436. Price 42 sh.