

Book Review

Works intended for notice in this column should be sent direct to the Book-Review Editor (M. M. Woolfson, Physics Department, University of York, Heslington, York YO1 5DD, England). As far as practicable books will be reviewed in a country different from that of publication.

Color and symmetry. By ARTHUR L. LOEB. Edited by M. J. BUERGER. Pp. xiii + 179. London: Wiley, 1971. Price £7.00.

The book with its rather general title may be subdivided into three main parts. In the first part the author derives the 7 line groups and the 17 two-dimensional space groups. In the second part dichromatic patterns are introduced and the 17 dichromatic line groups and the 46 truly dichromatic plane groups are developed. In the last part dealing with polychromatic patterns, polychromatic line groups and plane groups are derived. In the latter case one cannot speak of *the* polychromatic line and plane groups since colour groups can be defined in various ways and no universally accepted definition exists. Only two-dimensional configurations are treated by Loeb.

The procedure for deriving the monochromatic, dichromatic and polychromatic symmetries is what the author calls an exhaustive algorithmic method. It is to a large extent implicitly group-theoretical, but explicit use of this mathematical discipline is avoided. In fact the only places in the book where the reviewer was able to locate the word 'group' were – apart from the bibliography – in the foreword and in a footnote. The mathematical background required of the reader is light.

The results of the first two parts mentioned above are, of course, well-known, and here the reader is likely to centre his interest more on the method of derivation than on the results. The advantage of Loeb's method is that it is very self-contained and can be studied without consultation of outside literature. All theorems needed are derived.

The price paid for this integrality and the mathematical simplicity is a relative long-windedness in certain derivations, at least according to the taste of the reviewer. The nomenclature used to characterize the different configurations in the three main parts of the book is a natural outgrowth of the method of derivation and appears a little unfamiliar at first sight. Fortunately a translation into I. T. notation in the first part and into that of Shubnikov and Belov in the second part is given.

The third part is unique also in its results. The book abounds with carefully drawn and aesthetically pleasing patterns and here these configurations culminate in beautiful colour plates containing 11 line patterns and 86 plane patterns, in which 32 dichromatic ones are included. When contemplating these patterns without having followed Loeb's process of derivation the reader is likely to ask himself on what definition they are based. Loeb's synthetic approach which precludes a short definition at the outset does not facilitate a comparison with concepts of colour symmetry by other authors.

The book concludes with a special chapter in which three of Escher's well-known drawings are analyzed and classified according to the results obtained before.

Color and Symmetry will surely stimulate new interest in colour symmetries and will be of special interest to crystallographers. People active in design may also profit from this book.

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Books Received

The following books have been received by the Editor. Brief and generally uncritical notices are given of works of marginal crystallographic interest; occasionally a book of fundamental interest is included under this heading because of difficulty in finding a suitable reviewer without great delay.

Mathematical techniques and physical applications.

By J. KILLINGBECK and G. H. A. COLE. Pp. xiv + 715. New York: Academic Press 1971. Price \$15.00.

This book is intended as a senior/graduate text for students of the physical sciences. The content, by chapters, is: 1. Vector analysis; 2. Matrices; 3. Tensor analysis; 4. Sequences and series; 5. Complex variables and analytic functions; 6. Variational calculus; 7. Group representations; 8. Some differential equations of physics; 9. Integral equations; 10. Probability theory.

Secondary emission and structural properties of solids.

BY U. A. ARIFOV. Pp. ix + 144. New York: Plenum Press, 1971. Price \$22.40.

This is a translation of a Russian text devoted to work carried out in the Academy of Sciences of the Uzbek SSR in the city of Tashkent.

There are articles on theoretical and experimental work on the interaction of atomic collisions involving multiply-charged ions, on the use of positrons for studying matter and on structural research.