BOOK REVIEW

LEERBOEK DER GEOMETRISCHE KRISTALLOGRAPHIE, door P. TERPSTRA, 302 pp., 263 figs., 1 colored plate. P. Noorhoff, Groningen, **1927.**

This book, published over five years ago, seems to have escaped the attention of many American crystallographers. It contains the lectures given by the author to first year students at the University of Groningen, Holland. This is not a mere compilation of unexplained facts, but a true text-book in the best sense of the word.

It is scientific. Practically all propositions stated are proved; very few steps are omitted; when the author thinks a derivation is too long to be given in full, he indicates the trend of the reasoning. Successful efforts are made to tie up new ideas to already known concepts. Methods involving too advanced mathematical prerequisites are deliberately replaced by more elementary demonstrations. A quantitative viewpoint prevails throughout, in details (size of a crystal) as in fundamentals (accuracy of measurements and computations, validity of geometrical laws and formulae). Also the historical aspect is given due consideration.

More specific remarks will show the stand taken by the author on a few debatable questions.

Although the deficiencies of Mallard's definition of a crystal (a homogeneous anisotropic body) are recognized, no substitute is offered. Friedel's very satisfactory definition is not given. This leads to an incomplete statement of the scope of geometrical crystallography, given as "the study of the laws controlling the crystal faces" (these laws also apply to the planes of the other *discontinuous vectorial properties*, such as cleavage, twinning, gliding, x-ray "reflections").

The treatment of stereographic projection is excellent. The statements of constructions and proofs are so interwoven that it is hard to find the "recipe" for solving a stereographic problem without understanding the demonstration. The old stumbling block that *two planes passed through the poles of two great circles cut off equal arcs from these two great circles* is given an illuminating demonstration by means of an excellent figure. One property, however, is implied, although neither proved nor postulated, namely, *the projection of a tangent to a curve is tangent to the projection of the curve*. The author recommends the Wulff net and favors the combined gnomonic and stereographic projections.

In the *law of rationality*, a commonly overlooked statement is brought out: If OA, OB, OC be the intercepts of the unit-face; OH, OK, OL, those of a face (*hkl*), then the ratios OH:OA, OK:OB, OL:OC need not be rational; all the law requires is that the ratios $\frac{OH}{OA}:\frac{OK}{OB}:\frac{OL}{OC}$ be rational (three examples illustrate this point).

The validity of the law is well discussed. Although the author presents three different forms of the law (indices, zones, anharmonic ratio), he omits its geometrical expression by means of a space-lattice . . . the only way of grasping its full significance (reticular densities)! Many pages are devoted to the *complications* (Goldschmidt-Fedorov), an imperfect substitute for the Law of Bravais.

The symmetry symbols used are similar to those of Niggli and Schoenflies. No complete derivation of the 32 classes is attempted, but the essentials are given in the form of symmetry theorems. Terpstra uses one kind of alternating symmetry only, rotatory reflection.

The fifth chapter (zonal relations, transformation formulae) is one of the best in the book. As the student is not expected to know solid analytical geometry, the equation of a plane is derived by Cesàro's elementary method. Terpstra reduces most of the three-dimensional problems to questions of plane geometry by passing all planes through the point $z=c$. Cesàro's elementary derivation of the anharmonic ratio of four tautozonal faces is given. The duality principle is explained; "trimetric coordinates" are introduced. The old mnemonic rule of *cross-multiplication* ceases to be a magician's trick since enough is given about determinants and matrices for a logical derivation. The problem of teaching crystallography to students with scant mathematical background apparently can be solved!

In the description of crystal forms, the emphasis is laid on the derivation of forms from one another and also on the application of the Addition and Subtraction Rules. Terpstra sides with the opponents of merohedry, and yet manages to make use of the simplicity of merohedral derivations without patronizing merohedral nomenclature. Fedorov's idea of *isotropic zone* is introduced. A good feature is the table of forms of the isometric system with sketches showing the differences in the *face symmetry* of forms occurring in several crystal classes.

In the hexagonal system, the Bravais notation is adopted, and Weber's elegant four-index symbols are also preferred for zone notation. Both Miller and Bravais axes are used for the five classes of the rhombohedral subsystem.

The chapter on triclinic crystals contains interesting pages on the construction of the *rhombic section* in a stereographic projection, also the graphic determination of axial elements by means of a gnomonic projection.

Twelve pages are devoted to an elementary presentation of twinning, which exclusively reflects the tendencies of the German School. No heed is given to the remarkable explanation of twinning in terms of the space-lattice (the Mallard-Friedel theory).

Numerous exercises and problems are appended. The book is abundantly illustrated, well indexed, clearly printed, and solidly bound. It is gratifying that Dutch, of all languages, should be the most closely akin to English!

J. D. H. DONNAY

MINERALOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND

ANNIVERSARY MEETING, NOVEMBER 9TH, 1933.

The following were elected officers and members of Council:—

President, Sir Thomas H. Holland; *Vice-Presidents*, Sir William H. Bragg and Mr. Arthur Russell; *Treasurer*, Mr. F. N. Ashcroft; *General Secretary*, Mr. W. Campbell Smith; *Foreign Secretary*, Prof. A. Hutchinson; *Editor of the Journal*, Dr. L. J. Spencer; *Ordinary Members of Council*, Prof. C. E. Tilley, Prof. P. G. H. Boswell, Prof. H. L. Bowman, Dr. L. Hawkes, Dr. W. R. Jones, Dr. F. Coles Phillips, Mr. J. B. Scrivenor, Mr. F. A. Bannister, Mr. T. Crook, Dr. W. F. P. McLintock, Mr. L. R. Wager, Dr. A. K. Wells.

PROF. P. L. DRAVERT (of Omsk): *Shower of meteoric stones in the neighbourhood of the village of Kuznetzovo, West Siberia, on May 26, 1932.* Between 5 and 6 P.M. in a cloudless sky ten detonations were heard, and one stone of 2 kg. was seen to fall, making a small oblique hole and then rebounding. Eight stones with a total weight