of position in the Riemann surface. The interest centers in the point systems at which the theta function vanishes. To complete the theory in certain respects, in which it is still open to criticism on account of the possibility of the occurrence of point systems of special character, is the chief aim of this part of the paper. This, together with the critical remarks and illustrative examples collected into an appendix of four pages at the end of the work, form a new and useful contribution to the Riemann theory.

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MATHEMATICAL CRYSTALLOGRAPHY.

Mathematical Crystallography and the Theory of Groups of Movements. By HAROLD HILTON Oxford, The Clarendon Press, 1903. 262 pp.

THE problem of crystallography is to establish a correspondence between chemical composition or certain abstract aspects of it and geometric form in crystals.

Setting aside the work, usually assigned to the mineralogist, of reducing the actual forms of crystals to idealized representatives, and the chemist's problem, of establishing the molecular configuration, and showing why given molecules are more likely to be piled in one way than another, the subject matter of mathematical crystallography is the formal problem of showing a correspondence between the idealized forms of the mineralogist and the geometrically possible methods of piling, that is of filling space of three dimensions with interpenetrant homogeneous assemblages. Mr. Hilton's work undertakes to set this out as it has been done by Bravais, Sohncke, Schoenflies and others, and also to supply such geometric material as may be pertinent.

Dealing first with the main issue the definition of subject matter (page 11) amounts to this: The idealized forms of natural crystals are polyhedra with rational indices; more explicitly polyhedra whose faces are parallel to the set of planes

$$\frac{hx}{a}+\frac{ky}{b}+\frac{lz}{c}=0,$$

where a, b, c are any real positive quantities and h, k, l, the "indices," are integers, usually small.