cepts, and of constancy of crystalline form, does not differ very materially, in its essential points, from the views now prevailing, is a remarkable tribute to his genius, and will forever render the name of Haüy famous as the "Father of Crystallography." This proud title is most appropriate and has been bestowed upon Haüy with reason. If any support were needed, it is only necessary to recall the testimony of Henry James Brooke, in his "Familiar Introduction to Crystallography," published in 1823 a few years after Haüy's death, to the effect that "The Abbey Haüy's works on crystallography are the only ones in which a truly scientific exposition of the theory of crystals is to be found." His work has afforded the key wherewith it has been possible for his successors to unlock many of the secrets of crystal structure, and the great strides which the science has made during the past century have all had, as their starting point, the discoveries and theories of Haüy. It is especially fitting that now, on the one hundred and seventy-fifth anniversary of his birth, crystallographers thruout the world should unite in paying homage to the memory of this distinguished scientist, and should be reminded afresh of the extent to which the science of crystallography is indebted to his brilliant pioneer work.

HAÜY'S LAW OF RATIONAL INTERCEPTS

ALFRED J. MOSES

Columbia University

ALTHO crystals had been observed for thousands of years they had been regarded as little more than freaks of nature without regularity in shape or constancy in angles until in 1669 Steno showed that in quartz or rock crystal the angles between corresponding faces were constant, no matter how much the crystals varied in shape; and Guglielmini in 1704 extended this by stating that every substance had its peculiar crystals, the angles of which were constant.

But crystals of the same substance are not always bounded by corresponding faces and both the numbers of faces and the values of the angles are often different on different crystals. That any intimate relation between such crystals existed was first shown by Romé de l'Isle, who with the newly invented goniometer measured all obtainable crystals, made models and drawings of them, and in 1783 described over four hundred forms; he showed that the different crystals of any one substance consituted a series the members of which could be derived by modifying one so-called primitive form by secondary planes, each geometrically similar part of the primitive form being replaced by the same number of planes in the same way. In other words, de l'Isle discovered the law of symmetry: "all crystals of any one substance are of the same grade of symmetry," and thereby placed all forms possible with crystals of the same substance in a definite series.

In de l'Isle's series, however, the secondary or modifying planes could be at any angles provided the symmetry was maintained, and theoretically, the number of possible forms was still infinite. Haüy's great service was the discovery of the limiting law.

Bergmann, in 1773, had shown that calcite could be cleaved into six-faced forms (rhombohedra) of constant angles and that these could be built again into the many crystal forms of calcite. Haüy assumed that this property of cleavage was common to all crystals and developed on this basis a theory of crystal structure in which the cleavage form was assumed to be the primitive form or nucleus and the secondary forms to result by the addition on each face of successive layers made up of rows of little "integrant molecules," polyhedra of shapes determined by the cleavage. Each successive layer was assumed to diminish regularly by the subtraction of one or more rows and each row by one or more molecules, *always by some simple rational number, never to his knowledge exceeding four;* and the planes tangent to the resultant step-like solids were at the angles actually observed in the crystals.

Haüy's theory of crystal structure has been abandoned, at least as to the exact details, but his discovery, that the faces of crystals of the same substance do not occupy arbitrary relative positions but must fulfill certain conditions which can be expressed by simple rational numbers, is the basis of the greatest law of crystallography, the law of rational intercepts.