was to mark the permanent additions he made to the science. His system did, however, require completion and rectification in various points; and in speaking of the crystallographers of the subsequent time, who may all be considered as the cultivators of the Hauïan doctrines, we must also consider what they did in correcting them.

The three main points in which this improvement was needed were;—a better determination of the crystalline forms of the special substances;—a more general and less arbitrary method of considering crystalline forms according to their symmetry; and a detection of more general conditions by which the crystalline angle is regulated. The first of these processes may be considered as the natural sequel of the Hauïan epoch: the other two must be treated as separate steps of discovery.

When it appeared that the angle of natural or of cleavage faces could be used to determine the differences of minerals, it became important to measure this angle with accuracy. Haüy's measurements were found very inaccurate by many succeeding crystallographers: Mohs says[1] that they are so generally inaccurate, that no confidence can be placed in them. This was said, of course, according to the more rigorous notions of accuracy to which the establishment of Haüy's system led. Among the persons who principally labored in ascertaining, with precision, the crystalline angles of minerals, were several Englishmen, especially Wollaston, Phillips, and Brooke. Wollaston, by the invention of his Reflecting Goniometer, placed an entirely new degree of accuracy within the reach of the crystallographer; the angle of two faces being, in this instrument, measured by means of the reflected images of bright objects seen in them, so that the measure is the more accurate the more minute the faces are. In the use of this instrument, no one was more laborious and successful than William Phillips, whose power of apprehending the most complex forms with steadiness and clearness, led Wollaston to say that he had "a geometrical sense." Phillips published a Treatise on Mineralogy, containing a great collection of such determinations; and Mr. Brooke, a crystallographer of the same exact and careful school, has also published several works of the same kind. The precise measurement of crystalline angles must be the familiar employment of all who study crystallography; and, therefore, any further enumeration of those

[1] Marx. p. 153