

cists were now alike compelled to venture on some more definite hypothesis, descriptive of the great variety of constitution which the molecules of chemically distinct substances exhibit. These molecules show in their combining numbers, and in their physical properties, great fixity, excluding apparently all gradual transitions. The manner in which they enter into, and again separate out of, combinations and compounds, always regaining and showing their original characteristics, forced more and more upon natural philosophers the conviction that compounds were merely geometrical arrangements of individually independent atoms, and that these atoms must possess geometrically different forms and figures, enabling them, without loss of their individuality, to enter into varying configurations.

40.
Geometrical
arrangement
of atoms.

The conception of the molecule as a system of atoms, geometrically arranged, had gradually grown from vague suggestions in the minds of physicists as well as chemists — *i.e.*, of students of the quantitative as well as of those of the qualitative properties of substances. To the former it was especially the forms of crystals, to the latter the different degrees of saturation of chemical substances, that suggested a geometrical arrangement of atoms as the constitution of the smallest particles or molecules of different substances.

Ever since the study of the regular forms of minerals or of artificially prepared crystals was reduced to an exact science by the labours of Haüy, at the end of the last century,¹ the forms of these regular shapes have been valued by investigators, for two distinct rea-

41.
Crystallo-
graphy.

¹ See above, chapter i. p. 116.