

recognized in the formation of common language; as *earths, stones, metals*. But such arrangements were manifestly vague and confused; and when chemistry had advanced to power and honor, her aid was naturally called in to introduce a better order. "Hiarne and Bromell were, as far as I know," says² Cronstedt, "the first who founded any mineral system upon chemical principles; to them we owe the three known divisions of the most simple mineral bodies; viz., the *calcarei, vitrescentes, and apyri*." But Cronstedt's own *Essay towards a System of Mineralogy*, published in Swedish in 1758, had perhaps more influence than any other, upon succeeding systems. In this, the distinction of earths and stones, and also of vitrescent and non-vitrescent earths (*apyri*), is rejected. The earths are classed as *calcareous, siliceous, argillaceous*, and the like. Again, calcareous earth is pure (*calc spar*), or united with acid of vitriol (*gypsum*), or united with the muriatic acid (*sal ammoniac*), and the like. It is easy to see that this is the method, which, in its general principle, has been continued to our own time. In such methods, it is supposed that we can recognize the substance by its general appearance, and on this assumption, its place in the system conveys to us chemical knowledge concerning it.

But as the other branches of Natural History, and especially Botany, assumed a systematic form, many mineralogists became dissatisfied with this casual and superficial mode of taking account of external characters; they became convinced, that in Mineralogy as in other sciences, classification must have its system and its rules. The views which Werner ascribes to his teacher, Pabst van Ohain,³ show the rise of those opinions which led through Werner to Mohs: "He was of opinion that a natural mineral system must be constructed by chemical determinations, and external characters at the same time (*methodus mixta*); but that along with this, mineralogists ought also to construct and employ what he called an *artificial system*, which might serve us as a guide (*loco indicis*) how to introduce newly-discovered fossils into the system, and how to find easily and quickly those already known and introduced." Such an artificial system, containing not the grounds of classification, but marks for recognition, was afterwards attempted by Mohs, and termed by him the *Characteristic* of his system.

Werner's System.—But, in the mean time, Werner's classification had an extensive reign, and this was still a mixed system. Werner himself, indeed, never published a system of mineralogy. "We might

² *Mineralogy*, Pref. p. viii.

³ Frisch. *Werner's Leben*, p. 15.