

form. And though none of the other properties have yet been referred to standards so definite as that which geometry supplies for crystals, a system has been introduced which makes their measures far more constant and precise than they are to a common undisciplined sense.

The author of this system was Abraham Gottlob Werner, who had been educated in the institutions which the Elector of Saxony had established at the mines of Freiberg. Of an exact and methodical intellect, and of great acuteness of the senses, Werner was well fitted for the task of giving fixity to the appreciation of outward impressions; and this he attempted in his *Dissertation on the external Characters of Fossils*, which was published at Leipzig in 1774. Of the precision of his estimation of such characters, we may judge from the following story, told by his biographer Frisch.¹ One of his companions had received a quantity of pieces of amber, and was relating to Werner, then very young, that he had found in the lot one piece from which he could extract no signs of electricity. Werner requested to be allowed to put his hand in the bag which contained these pieces, and immediately drew out the unelectrical piece. It was yellow chalcidony, which is distinguishable from amber by its weight and coldness.

The principal external characters which were subjected by Werner to a systematic examination were color, lustre, hardness, and specific gravity. His subdivisions of the first character (*Color*), were very numerous; yet it cannot be doubted that if we recollect them by the eye, and not by their names, they are definite and valuable characters, and especially the metallic colors. Breithaupt, merely by the aid of this character, distinguished two new compounds among the small grains found along with the grains of platinum, and usually confounded with them. The kinds of *Lustre*, namely, *glassy*, *fatty*, *adamantine*, *metallic*, are, when used in the same manner, equally valuable. *Specific Gravity* obviously admits of a numerical measure; and the *Hardness* of a mineral was pretty exactly defined by the substances which it would scratch, and by which it was capable of being scratched.

Werner soon acquired a reputation as a mineralogist, which drew persons from every part of Europe to Freiberg in order to hear his lectures; and thus diffused very widely his mode of employing external characters. It was, indeed, impossible to attend so closely to

¹ *Werner's Leben*, p. 26.