and supposed that he had thus removed all that was arbitrary and vague in the previous chemical systems of mineralogy.

Though the attempt appeared so well justified by the state of chemical science, and was so plausible in its principle, it was not long before events showed that there was some fallacy in these specious appearances. In 1820, Mitscherlich discovered Isomorphism: by that discovery it appeared that bodies containing very different electro-positive elements could not be distinguished from each other; it was impossible, therefore, to put them in distant portions of the classification;—and thus the first system of Berzelius crumbled to pieces.

But Berzelius did not so easily resign his project. With the most unhesitating confession of his first failure, but with undaunted courage, he again girded himself to the task of rebuilding his edifice. Defeated at the electro-positive position, he now resolved to make a stand at the electro-negative element. In 1824, he published in the Transactions of the Swedish Academy, a Memoir *On the Alterations in the Chemical Mineral System, which necessarily follow from the Property exhibited by Isomorphous Bodies, of replacing each other in given Proportions.* The alteration was, in fact, an inversion of the system, with an attempt still to preserve the electro-chemical principle of arrangement. Thus, instead of arranging metallic minerals according to the *metal*, under iron, copper, &c., all the *sulphurets* were classed together, all the *oxides* together, all the *sulphates* together, and so in other respects. That such an order was a great improvement on the preceding one, cannot be doubted; but we shall see, I think, that as a strict scientific system it was not successful. The discovery of isomorphism, however, naturally led to such attempts. Thus Gmelin also, in 1825, published a mineral system,[6] which, like that of Berzelius, founded its leading distinctions on the electro-negative, or, as it was sometimes termed, the *formative* element of bodies; and, besides this, took account of the *numbers* of atoms or proportions which appear in the composition of the body; distinguishing, for instance, Silicates, as simple silicates, double silicates, and so on, to *quintuple* silicate (*Pechstein*) and *sextuple* silicate (*Perlstein*). In like manner, Nordenskiöld devised a system resting on the same bases, taking into account also the crystalline form. In 1824, Beudant published his *Traité Elémentaire de Minéralogie*, in which he professes to found his arrangement on the electro-negative element, and on Ampère's circular arrange-

[6] *Zeitsch. der Min.* 1825, p. 435.