

more trustworthy? Was not the necessity of an entire change of system, a proof that the ground, whatever that was, on which the electro-chemical principle was adopted, was an unfounded assumption? And, in fact, do we not find that the same argument which was allowed to be fatal to the First System of Berzelius, applies in exactly the same manner against the Second? If the electro-positive elements be often isomorphous, are not the electro-negative elements sometimes isomorphous also? for instance, the arsenic and phosphoric acids. But to go further, what is the ground on which the electro-chemical arrangement is adopted? Granted that the electrical relations of bodies are important; but how do we come to know that these relations have anything to do with mineralogy? How does it appear that on them, principally, depend those external properties which mineralogy must study? How does it appear that because sulphur is the electro-negative part of one body, and an acid the electro-negative part of another, these two elements similarly affect the compounds? How does it appear that there is any analogy whatever in their functions? We allow that the composition must, in *some way*, determine the classified place of the mineral,—but why in *this way*?

I do not dwell on the remark which Berzelius himself<sup>o</sup> makes on Nordenskiöld's system;—that it assumes a perfect knowledge of the composition in every case; although, considering the usual discrepancies of analyses of minerals, this objection must make all pure chemical systems useless. But I may observe, that mineralogists have not yet determined what characters are sufficiently affixed to determine a species of minerals. We have seen that the ancient notion of the composition of a species, has been unsettled by the discovery of isomorphism. The tenet of the constancy of the angle is rendered doubtful by cases of plesiomorphism. The optical properties, which are so closely connected with the crystalline, are still so imperfectly known, that they are subject to changes which appear capricious and arbitrary. Both the chemical and the optical mineralogists have constantly, of late, found occasion to separate species which had been united, and to bring together those which had been divided. Everything shows that, in this science, we have our classification still to begin. The detection of that fixity of characters, on which a right establishment of species must rest, is not yet complete, great as the progress is which we have made, by acquiring a knowledge of the laws of crystallization and of

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<sup>o</sup> *Jahres Bericht*. viii. 188.