sistent theoretical account of decomposition. The confirmation of Davy's discoveries by Faraday is of the nature of Newton's confirmation of the views of Borelli and Hooke respecting gravity, or like Young's confirmation of the undulatory theory of Huyghens.

We must not omit to repeat here the moral which we wish to draw from all great discoveries, that they depend upon the combination of *exact facts* with *clear ideas*. The former of these conditions is easily illustrated in the case of Davy and Faraday, both admirable and delicate experimenters. Davy's rapidity and resource in experimenting were extraordinary,[31] and extreme elegance and ingenuity distinguish almost every process of Faraday. He had published, in 1829, a work on *Chemical Manipulation*, in which directions are given for performing in the neatest manner all chemical processes. Manipulation, as he there truly says, is to the chemist like the external senses to the mind;[32] and without the supply of fit materials which such senses only can give, the mind can acquire no real knowledge.

But still the operations of the mind as well as the information of the senses, ideas as well as facts, are requisite for the attainment of any knowledge; and all great steps in science require a peculiar distinctness and vividness of thought in the discoverer. This it is difficult to exemplify in any better way than by the discoveries themselves. Both Davy and Faraday possessed this vividness of mind; and it was a consequence of this endowment, that Davy's lecture upon chemistry, and Faraday's upon almost any subject of physical philosophy, were of the most brilliant and captivating character. In discovering the nature of voltaic action, the essential intellectual requisite was to have a distinct conception of that which Faraday expressed by the remarkable phrase,[33] "*an axis of power having equal and opposite forces*:" and the distinctness of this idea in Faraday's mind shines forth in every part of his writings. Thus he says, the force which determines the decomposition of a body is *in* the body, not in the poles.[34] But for the most part he can of course only convey this fundamental idea by illustrations. Thus[35] he represents the voltaic circuit by a double circle, studded with the elements of the circuit, and shows how the *anïons* travel round it in one direction, and the *cathïons* in the opposite. He considers[36] the powers at the two places of action as balancing against each other through the medium of the conductors, in a manner analo-

---

[31] Paris, i. 145. [32] *Pref.* p. ii. [33] Art. 517.
[34] Art. 661. [35] 96. [36] 917.