

electric circuits—the phenomena of electro-magnetism, diamagnetism, and induction—were all resolved into elementary processes of attraction and repulsion, and summed up in a formula which looked like an extension of the Newtonian gravitation formula, revealing the mysterious influence of molecular forces.

“Oersted had found that an electric current acts on a magnetic pole, but that it neither attracts it nor repels it, but causes it to move round the current. He expressed this by saying that the electric conflict acts in a revolving manner. The most obvious deduction from this new fact was, that the action of the current on the magnet is not a push-and-pull force, but a rotary force, and accordingly many minds began to speculate on vortices and streams of ether, whirling round the current. But Ampère, by a combination of mathematical skill and experimental ingenuity, first proved that two electric currents act on one another, and then analysed this action into the resultant of a system of push-and-pull forces between the elementary parts of these currents.”¹

Weber in Germany took up the work where Ampère had left it.² One of his objects was to combine the

¹ Clerk Maxwell “On Action at a Distance” (‘Scientific Papers,’ vol. ii. p. 317).

² Weber’s interest was twofold. The primary object was to put accurate quantitative data in the place of merely qualitative descriptions or mere estimates of phenomena. He had then already published, together with his brothers (see *supra*, p. 196, note 3), two works in which in a similar way exact research has taken the place of inexact description. The first

was his experimental investigation of wave-motion (‘Die Wellenlehre auf Experimente gegründet,’ 1825), the other the still more delicate attempt to treat a physiological phenomenon, the mechanism of the organs of locomotion, on exact mechanical principles (1836). This rare gift of exactness, invaluable at all times, but almost unique at that time in Germany, where philosophical vagueness was only too common, attracted the notice of Gauss, who brought Weber to Göttingen in 1830 after