the ions, and how, during the process, wandering atoms gave up or lost a definite something—viz., their electrical charges. It seemed impossible in this case to do without an atomic or molecular view of electricity. Accordingly, Helmholtz, in his celebrated Faraday Lecture (1881), after having traced the gradual displacement of the Weberian theory of electrical particles acting at a distance by that of Faraday, feels himself constrained to say: "I see very well that the assumption of two imponderable fluids of opposite qualities is a rather complicated and artificial machinery, and that the mathematical language of Clerk Maxwell's theory expresses the laws of the phenomena very simply and very truly; . . . but I confess I should really be at a loss to explain . . . what he considers as a quantity of electricity, and why such a quantity is constant, like that of a substance." And further on he says: "If we accept the hypothesis that the elementary substances are composed of atoms, we cannot avoid concluding that electricity also . . . is divided into definite elementary portions, which behave like atoms of electricity."

54. Modern electrical researches.

Besides the phenomena of chemical decomposition, there was another very large and important class of phenomena which gradually led up to the conception of the substantial and atomic nature of electricity. This province of independent, and for a long time isolated, research was opened out by the combined genius of Plücker and Geissler. It was in the year 1857, two years before the announcement of the discovery of spectrum analysis, that Plücker, with the