

forms, and to have foreseen its importance and corresponding significance when applied to a great variety of scientific problems, notably to the projective processes in geometry. These were known to them mainly through the classical treatises of Poncelet and Chasles, the leading ideas of which had been introduced to British students by the labours of the Dublin school.¹

The investigations referred to mark the junction of two important lines of mathematical research, which had been carried on independently in earlier times, or only united for special purposes or for the solution of special problems. The history of the progress of geometry during the nineteenth century has already shown us the use and interest which belong to two different aspects of the common object, of which the one relies mainly on processes of measurement, including number, the other mainly on processes of description, in-

¹ The history of the doctrine of invariants has been written by Dr Franz Meyer, and is published in the first volume of the 'Jahresbericht der Deutschen Mathematiker Vereinigung' (p. 79 *sqq.*) The fact that this formed the first of the several Reports which the German Mathematical Society has undertaken to publish, testifies to the great importance which belongs to this doctrine in the history of recent mathematics. A concise summary with copious references is given by the same author in the first volume of the 'Encyklopädie der Math. Wissenschaften,' p. 320 *sqq.* How necessary the form and perfection of algebraic operations was for the development of the geometrical conceptions which are laid down, *c.g.*, in the works of Plücker, can be seen in the work of Otto Hesse, who introduced ele-

gance and conciseness into many of the expositions which, for want of this formal development, appear cumbrous in the writings of Plücker. "The analytical form in which Plücker's Researches present themselves is frequently wanting in that elegant form to which we have become accustomed, specially through Hesse. Plücker's calculations frequently bear the stamp of mere aids for representing geometrical relations. That algebraical connections possess an interest in themselves, and require an adequate representation, was realised only by a generation which habitually employed methods that had been largely devised by Plücker himself" (A. Clebsch, 'Zum Gedächtniss an Julius Plücker,' 1872, p. 8. See also Gustav Bauer, 'Gedächtnissrede auf Otto Hesse,' München, 1882).