conception of the variable[1] has undergone in the course of the last hundred years. Here we come upon a term which was introduced into mathematical language mainly through the writings of Euler—the term function. It is used to denote the mathematical dependence of two or more variable quantities on each

[1] To the theory of equations in algebra there corresponds the theory of differential equations in analysis; and as the theory of algebraical equations had gradually emerged in a complete form out of investigations of special equations, or sets of equations, so likewise in analysis a general theory of differential equations is gradually being evolved out of the scattered and very extensive investigations of special differential equations which presented themselves notably in the application of analysis to astronomical and physical problems. It is claimed by those who have grasped the abstract ideas of Sophus Lie, that he has taken a great step forward in the direction of a general theory of differential equations, by applying methods which suggested themselves to him through the general theory of algebraic forms and its connection with geometry. Accordingly, the theories of Lie can be termed an algebraical theory of differential equations, depending upon transformations analogous to those which had been established in the general theory of forms or quantities of which I treated above. Prof. Engel, in his obituary notice of Sophus Lie ('Deutsche Math. Ver.,' vol. viii. p. 35), tells us that in the year 1869-70, when Lie met Prof. Klein in Berlin, the former was occupied with certain partial differential equations which exhibited, under certain transformations, invariantive properties, and that Klein then pointed out "that his procedure had a certain analogy with the methods of Abel. The suggestion of this analogy became important for Lie, as he was generally intent upon following up more closely the analogies with the theory of algebraical equations." Dr H. F. Baker, in his recent article on Differential Equations in the 'Ency. Brit.' (vol. xxvii. p. 448), roughly distinguishes two methods of studying differential equations, which he names respectively "transformation theories" and "function theories," "the former concerned to reduce the algebraical relation to the fewest and simplest forms, eventually with the hope of obtaining explicit expressions of the dependent in terms of the independent variables; the latter concerned to determine what general descriptive relations among the quantities are involved by the differential equations, with as little use of algebraical calculations as may be possible." For the history of thought and connection of ideas, it is interesting to learn, through Prof. Engel, that it was not purely algebraical work,—such as is represented by Galois and Jordan, to which Lie was early introduced by Prof. Sylow,—but the study of Poncelet's and Plücker's methods which led Lie to his original conceptions, and that he was fond of calling himself a pupil of Plücker, whom he had never seen (Engel, *loc. cit.*, p. 34).