REPORT ON THE THEORY OF PROJECTIVE INVARIANTS: THE CHIEF CONTRIBUTIONS OF A DECADE.

BY PROFESSOR H. S. WHITE.

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Introduction.

IF we find it useful to distinguish short periods in the development of a science, the theory of invariants may easily enough be considered to have passed a milestone in 1887. In that year was published the second part of Gordan's Vorlesungen über Invariantentheorie. The plan of this work was dominated by the intent to expound and exemplify worthily the famous Gordan theorem on the finiteness of the form system of one or more binary forms. Gordan had announced and proven this theorem of fundamental importance in 1868,* and had since that time simplified his methods at least twice; and his was still in 1887, with one exception, the only current proof of the theorem. The two proposed by Jordan† and Sylvester‡ seem to have been not enough simpler to secure currency. The statement is, in briefest form, this: *For every binary form there is a finite system of covariants, in terms of which all other covariants, infinite in number, can be expressed rationally and integrally.* Without recalling here the details of the argument, we may characterize it as depending altogether upon the nature of the operations which generate covariants.

The one exception, just referred to, was a radically new method devised by Mertens, published in vol. 100 of the *Journal für reine und angewandte Mathematik.* By inductive process, assuming the theorem true for any given set of forms, he proves that it must still hold true when the order of one of the forms is increased by a unit. This method is deserving of attentive consideration, by virtue of its simplicity and power as shown in this first application, and even more on account of the strong probability that it might have been so extended as to prove the corresponding theo-

* *Crelle*, vol. 69.

† *Liouville's Journal*, 3d series, vol. 2 (1876), p. 122.

‡ *Proc. Lond. Math. Soc.*, vol. 27 (1878), p. 11–13.