THE EQUATION OF THE EIGHTH DEGREE*

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1. *Introduction.* The progress of mathematics as a whole is occasionally brought to our attention by the appearance of some notable book or memoir in which the resources of the subject are brought from various fields to bear upon a central problem. An early instance of this is the *Ikosaeder*[1] of Klein—the forerunner of the Klein-Fricke series. The first two chapters of this book furnish an introduction to group theory which is as yet unsurpassed. A later example is the book of Hudson on *Kummer's Quartic Surface.*[2] This surface, remarkable in itself, is more remarkable for the breadth of the theories which attach to it. Central problems in these two books are respectively the quintic and the sextic equation. It is true that Hudson assumes the solution of the sextic when needful, but his book furnishes the geometric background for this solution.

Around the sextic equation there cluster the geometric theory of the Weddle and Kummer surfaces and of certain modular three-ways in S_4 as well as the analytic theory of the hyperelliptic integrals and functions of genus two, a complex in which the methods of algebra and group theory have constant play. For the most part the allied geometry is within the spaces of our experience, and with the correspondingly small number of variables the methods of ordinary analytic geometry are effective. The analytic function theory is also fairly manageable by direct methods. When, however, we seek to extend this field of ideas to equations of higher even degree complications develop

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