RESOLVENT SEXTICS OF QUINTIC EQUATIONS

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1. *Introduction.* The object of this paper is to give simple derivations of the classic resolvents which have been obtained heretofore by elaborate computations.

Jacobi* established the form of a remarkable resolvent, but neither found the values of the coefficients nor gave the simple details (§ 2 below) which lead directly to that form.

Cayley† was not aware of Jacobi's work when he fully computed the same resolvent. Noting that its roots are functions of the differences of the roots x_i of the quintic, he first computed at length the resolvent sextic under the restriction that $x_5 = 0$. Then the coefficients were "completed by the introduction of the terms involving the constant coefficient of the quintic." No details were given of the latter long computation, which may perhaps be best made by utilizing the fact that the coefficients are seminvariants. The simple new method employed here (§ 3) makes initial use of the latter fact as well as of a lemma which reduces the search for the needed seminvariants of the quintic to a mere inspection of the invariants of a quartic.

From the Jacobi-Cayley resolvent (which is a simple transform of the old Malfatti resolvent) it is an immediate step (§ 5) to the noteworthy covariant resolvent discovered by Perrin,‡ and independently by McClintock,§ each time as the final step of a long computation.

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* JOURNAL FÜR MATHEMATIK, vol. 13 (1835), pp. 340–52; WERKE, vol. 3, 1884, pp. 269–84.

† PHILOSOPHICAL TRANSACTIONS, London, vol. 151 (1861), pp. 263–76; COLLECTED MATHEMATICAL PAPERS, vol. 4, pp. 309–24.

‡ COMPTES RENDUS DU DEUXIÈME CONGRÈS INTERNATIONAL DES MATHÉMATICIENS, Paris, 1902, pp. 199–223. Announced in BULLETIN DE LA SOCIÉTÉ DE FRANCE, vol. 11 (1882-83), pp. 64–65.

§ AMERICAN JOURNAL, vol. 8 (1886), pp. 45–84; vol. 20 (1898), pp. 157–192.