Harry Bateman*

29 May, 1882—21 January, 1946

In the sudden death (from coronary thrombosis) of Harry Bateman while en route to New York, near Milford, Utah, mathematics in the United States lost its outstanding representative of the British School of the generation just closing. Like his contemporaries and immediate predecessors among Cambridge mathematicians of the first decade of this century, before the new regulations for the Mathematical Tripos took effect, Bateman was thoroughly trained in both pure analysis and mathematical physics, and retained an equal interest in both throughout his scientific career. In bare outline the relevant details of his life are as follows:

Harry Bateman was born at Manchester, England, 29 May, 1882, a son of Samuel and Marnie Elizabeth (Bond) Bateman, and received his secondary education at the Manchester Grammar School. Bateman ascribed much of his subsequent success at Trinity College, Cambridge, to the excellent instruction he received at the school. In 1903 he was (bracketed) Senior Wrangler in the Tripos, and took his B.A. degree, proceeding to the M.A. in 1906, having been a Smith's Prizeman in 1905. From 1905 to 1911 he was a Fellow of Trinity College: the year 1905–06 was spent in study at Göttingen and Paris. From 1906 to 1907 he was a lecturer at the University of Liverpool, and from 1907 to 1910 a reader at the University of Manchester. He came to the United States in 1910 (he later became a naturalized U. S. citizen), as a lecturer at Bryn Mawr College, where another English mathematician, the late Charlotte Angas Scott, was the efficient and scholarly head of the mathematics department. In 1912, he went to the Johns Hopkins University as a Johnston scholar for three years, incidentally taking his Ph.D. (a curious proceeding for a mathematician of his eminence) in 1913. From 1915 to 1917 he was a lecturer at Johns Hopkins, and in 1917 he accepted the position which he held till his death, a professorship of mathematics, physics, and aeronautics at the then recently organized California Institute of Technology. He was a member of the American Mathematical Society (vice-President, 1935, Gibbs lecturer, 1943), the American Physical Society, the American Acoustical Society, the American Philosophical Society, the British Association for the Advancement of Science, the London Mathematical Society, the National (U. S.) Academy of Sciences, and a Fellow of the Royal Society (London). He is survived by his wife, Ethel (Horner Dodd) Bateman, and his daughter, Joan; a son died in childhood.

* Professor Bateman was a member of the Board of Collaborators of the Quarterly of Applied Mathematics from its foundation to his lamented decease.
Bateman was an almost unique combination of erudition and creativeness. It is most unusual for a mathematician to have the extraordinary range of exact knowledge that Bateman had, and not be crushed into sterility by the mere burden of an oppressive scholarship. But, as his numerous publications testify, Bateman retained his creative originality till his death. In pure mathematics, his dominating interest was in the analysis that has developed from classical mathematical physics. His technical skill in this broad field was unrivalled. His numerous contributions to mathematical physics are marked by a vivid, at times almost romantic, imagination. Students of the history of general relativity will find much of interest in some of his papers on electromagnetism.

A singularly modest and gentle man, Bateman was always ready to place his skill and his knowledge at the disposal of others, with no thought of personal credit. War work absorbed most of his time during the last four years of his life; and it is to be regretted that the incessant correspondence in connection with such work prevented him from putting the finishing touches to what he regarded as his most useful contributions to mathematical scholarship: an exhaustive work on definite integrals, and a critical census of all the special functions that have been considered in mathematics. If these works can be put into shape for publication, they will form a lasting memorial to Harry Bateman.

April, 1946.

E. T. Bell

LIST OF PUBLICATIONS BY HARRY BATEMAN*

1. Question 14943. Educational Times (2) 1, 98–100 (1902).
5. Question 15440. Educational Times (2) 5, 68 (1904).
8. Certain definite integrals and expansions connected with the Legendre and Bessel functions. Mess. (2) 33, 182–188 (1904).

31. The tangent plane which can be drawn to an algebraic surface from a multiple line. Arch. der Math. und Phys. (3) 13, 48–51 (1908).
32. A method of calculating the number of degrees of freedom of a molecule among which the partition of energy is governed by the principal temperature. Manchester Mem. and Proc. 53, 1–9 (1908).
38. The linear difference equation of the third order and a generalisation of a continued fraction. Quart. J. Math. 41, 302–308 (1910).
39. The solution of the integral equation connecting the velocity of propagation of an earthquake-wave in the interior of the earth with the times which the disturbance takes to travel to the different stations on the earth's surface. Phil. Mag. (6) 19, 576–587 (1910); Physik. Zs. 11, 96–99 (1910).
44. The determination of solutions of the equation of wave motion involving an arbitrary function of three variables which satisfies a partial differential equation. Trans. C. P. S. 21, 257–280 (1910).
46. A system of circles derived from a cubic space curve and the properties of a certain configuration of fifteen lines. Mess. (2) 40, 81–87 (1910).
49. Correction to Mr. H. Bateman's paper on the Reflexion of light at an ideal plane mirror moving with a uniform velocity of translation. Phil. Mag. (6) 19, 824 (1910).
52. The transformation of coordinates which can be used to transform one physical problem into another. Proc. L. M. S. (2) 8, 469–488 (1910).
56. The foci of a circle in space and some geometrical theorems connected herewith. British Ass. Rep. (Sheffield) 80, 532–533 (1911).
58. The transformation of a particular type of electromagnetic field and its physical interpretation. Proc. L. M. S. (2) 10, 7–14 (1911).
60. The fundamental equations of the theory of electrons and the infinitesimal transformation of an electromagnetic field into itself. Bull. A. M. S. (2) 17, 525 (1911).
63. Some geometrical theorems connected with Laplace's equation and the equation of wave motion. Amer. J. Math. 34, 325–360 (1912).
68. The expression of the equation of the general quartic curve in the form \( A/x^2 + B/y^2 + C/z^2 = 0 \). Bull. A. M. S. (2) 19, 393–394 (1913).
76. On a porism connected with the theory of Maxwell's equations and a method of obtaining the lines of electric force due to a moving point charge. Amer. J. Math. 37, 192–194 (1915).
84. On the relation of the theory of integral equations to the subject of the calculus of operations and functions. Science Prog. 11, 508–512 (1917).
93. The solution of the wave equation by means of definite integrals. Bull. A. M. S. (2) 24, 296–301 (1918).


103. Correspondences between three-dimensional and four-dimensional potential problems. Mess. (2) 51, 151–160 (1921).

104. Electricity and gravitation. Phys. Rev. (2) 17, 64–69 (1921).


121. The field of an electron at rest and in uniform motion. Phil. Mag. (6) 49, 1–18 (1925).


137. The equation for the transverse vibrations of thin rods. Mess. (2) 57, 145–154 (1928).


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151. The k-function, a particular case of the confluent hypergeometric function. Trans. A. M. S. 33, 817–831 (1931).


192. *Note on the function F(a, b; c − n; z).* Proc. N. A. S. 30, 28–30 (1944).


194. (H. B. and R. C. Archibald). *A guide to tables of Bessel functions.* Mathematical Tables and Other Aids to Computation 1, 205–308 (1944).


197. Articles on *Dynamics, Elasticity.* Encyclopedia Britannica (1945).


