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(*b*. Forfar, Scotland, 26 February 1882; *d*. Princeton, New Jersey, 9 October 1948), *mathematics*.

Wedderburn was the tenth of fourteen children. His father, Alexander Wedderburn, was a physician in a family of ministers (on his father's side) and lawyers (on his mother's side). In 1898 Wedderburn matriculated at the University of Edinburgh; in 1903 her received an M.A. degree with first-class honors in mathematics. No doubt influenced by the work of Frobenius and Schur, he went to Leipzig and Berlin in 1904. During the same year he proceeded to the United States as a Carnegie fellow at the University of Chicago (E. H. Moore and L. E. Dickson were were there). From 1905 to 1909 he was lecturer at the University of Edinburgh and assistant to Chrystal. During this time Wedderburn edited the *Proceedings of the Edinburgh Mathematical Society* and in 1908 was awarded the doctorate of science.

In 1909 Wedderburn became one of the "preceptors" appointed under Woodrow Wilson at Princeton University. At the outbreak of World War I he enlisted in the British Army and fought in France. After the war he returned to Princeton, where he continued to teach until his retirement in 1945. When the mathematics department at Princeton assumed responsibility for publishing the *Annals of Mathematics*, Wedderburn was its editor from 1912 to 1928. Toward the close of the 1920's, he suffered what appears to have been a nervous breakdown. He led an increasingly solitary life and retired from his university post some years before the normal time. Wedderburn published thirty-eight papers and a textbook, *Lectures on Matrices* (1934), which in the last chapter contains an excellent account of his theorems and their background as well as some original contributions to the subject.

Wedderburn's mathematical work includes two famous theorems, which bear his name; both were established in the years 1905-1908. Before Wedderburn began his investigations, the classification of the semisimple algebras was done only if the ground field was the field of real or complex numbers. This did not lead to deeper insight into hyper-complex numbers (linear associative algebra). Wedderburn attacked the problem in a completely general way and introduced new methods and arrived at a complete understanding of the structure of semisimple algebras over any field. He showed that they are a direct sum of simple algebras and finally—in a celebrated paper ("On Hyper-complex Numbers") that was to be the beginning of a new era in the theory—proved that a simple algebra consists of all matrices of a given degree with elements taken from a division algebra.

Wedderburn's second important contribution concerns the investigation of skew fields with a finite number of elements. The commutative case had been investigated before Moore in 1903, and had led to a complete classification of all commutative fields with a given number of fields. Moore showed that for a given number p^r of elements there exists (apart from isomorphisms) only one field, namely the Galois field of degree *r* and characteristic *k*. Since a noncommutative finite field had never been found, one could suspect that it did not exist. In 1905 Wedderburn showed that every field with a finite number of elements is indeed commutative (under multiplication) and therefore a Galois field. This second theorem ("A Theorem on Finite Algebras") gives at once the complete classification of all semisimple algebras with a finite number of elements. But the theorem also had many other applications in number theory and projective geometry. It gave at once the complete structure of all projective geometries with a finite numberof points, and it showed that in all these geometries Pascal's theorem was a consequence of Desargues's theorem. The structure of semisimple groups was now reduced to that of non-commutative fields. Wedderburn's theorem had been the special case of a more general Diophantine property of fields and thus opened an entirely new line of research.

BIBLIOGRAPHY

I. Original Works. Wedderburn's works are "A Theorem on Finite Algebras," in *Transactions of the American Mathematical Society*, **6** (1905), 349–352; "Non-Desarguesian and Non-Pascalian Geometries," *ibid*., **8** (1907), 379–388, written with O. Veblen; "On Hypercomplex Numbers," in *Proceedings of the London Mathematical Society***6** , 2nd ser. (1907-1908), 77– 118: "The Automorphic Transformation of a Bilinear Form" in *Animals of Mathematics***23** ,2nd ser.(1921-1923). 122–134; "Algebraic Fields," *ibid*., **24** , 2nd ser. (1922-1923), 237–264: "Algebras Which Do Not Possess a Finite Basis," in *Transactions of the American Mathematical Society*, **31** (1925), 11–13; "Non-commutative Domains of Integrity," in *Journal füur die reine und angewandte Mathematik*, **167** (1931), 129–141; *Lectures on Matrices* (New York, 1934); "Boolean Linear Associative Algebra," in *Annals of Mathematics*, **35** , 2nd ser. (1934), 185–194; and "The Canonical Form of a Matrix," *ibid*., **39** , 2nd ser. (1938), 178–180.

II. Secondary Literature. See E. Artin, “The Influence of J. H. M. Wedderburn on the Development of Modern algebra,” in *Bulletin of the American Mathematical Society*, **56** (1950), 65–72.

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