Mental and Moral Heredity in Royalty. By FREDERICK ADAMS WOODS, M.D. New York, Henry Holt. 1906. Pp. viii + 312.

Dr. Woods presents here in book form his investigations, reported originally in *The Popular Science Monthly,* of the family resemblances and of the comparative importance of original nature and environment as determinants of human achievement in the case of some six hundred related individuals. These were selected at random and graded by at least approximately objective criteria for intellect and also for morality. Dr. Woods states the sources of his information and the nature of his procedure clearly and in full detail, so that any one who doubts his conclusions can repeat the research.

These conclusions are presented in two ways, first by a series of descriptions of the facts of heredity in the leading stocks of European royalty and second by a more general account of the amount of resemblance found in related individuals and of the evidence which proves this resemblance to be due almost exclusively to the similarity in conditions of birth rather than of breeding.

The descriptions of royal houses make up fourteen chapters, all excellent in substance but necessarily somewhat unattractive and difficult to follow in parts unless the reader already knows the history of European courts well or has a pronounced taste for genealogy. One hundred and four most interesting portraits accompany these chapters. The comments on general issues, such as the supposed progressive degeneration of royal families, the 'Hapsburg lip' and prepotency, and the correlation of the eminence of ruler with the prosperity of the ruled in the case of Portugal, are both excellent in substance and interesting and relieve the monotony of individual descriptions. In the general summary given in the two closing chapters, the following estimates of resemblance are given:

	In Intellect.	In Morality.
Resemblances of offspring to father	.3007	.2983
Resemblances of offspring to grandfather	.1606	.175
Resemblances of offspring to great-grandfather	.1528	

The resemblance of husband to wife was found to be only .08 (with a possible error of .076) in the case of intellect.

The resemblance of intellect and morality within the same individual was .3403.

Dr. Woods gives as evidence that similarities in original nature are the cause of at least nine tenths of the resemblance in intellect and, perhaps, of an approximately equal proportion of the resemblance in morality the following facts: The resemblance to the maternal great-grandfather equals .1528; the likeness in morality to the maternal grandfather is as great as to the paternal grandfather; eldest sons who inherit the opportunities of a sovereign show no higher achievements than their brothers.

Dr. Woods is convinced that alternate inheritance is the rule in mental qualities and even uses this as an accepted fact in arguing that environment must be comparatively unimportant because children of the same nurture often differ markedly in intellect and morals. He fails, however, to submit the matter to any of the tests by which blended and alternate inheritance can be distinguished.

There are throughout certain matters of method and of interpretation in respect to which historians and psychologists will differ with Dr. Woods. The only ones of much importance are his ignoring of the fact that all his data on morality concern moral superiority or inferiority in comparison to the status of one period of civilization rather than absolute morality, his possibly hasty acceptance of alternate inheritance in mental and moral qualities and his failure to give in any convenient form the data which will permit any one to repeat the purely statistical portion of his work by possibly better methods. It is to be hoped with respect to the latter point that he will soon print somewhere tables of the individual relationships from which his mass results are calculated.

On the whole we must all admire the energy and persistence which enabled Dr. Wood to carry through so elaborate a study and the general sanity and impartiality of spirit with which he has made his inferences. In the reviewer's opinion precise objective measure-

ments of living men and women will be our final criterion of the strength of mental inheritance, but Dr. Woods's work is an important contribution to psychology and a most admirable lesson to show that history may become a natural science.

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SCIENTIFIC JOURNALS AND ARTICLES.

To the January-February *Journal of Geology,* the opening number of Volume XIV., Dr. S. W. Williston contributes a paper entitled 'American Amphicœlian Crocodiles' and Professor R. S. Tarr an article on 'Glacial Erosion in the Finger Lake Region of Central New York.' E. C. Andrews, of Sydney, New South Wales, discusses 'The Ice-Flood Hypothesis of the New Zealand Sound Basins' and S. W. McCallie describes some 'Stretched Pebbles from Ocoee Conglomerate.' This article is illustrated by three figures. Professor A. P. Coleman, in a paper entitled 'Pre-Cambrian Nomenclature,' reviews certain features of the report of the committee of American and Canadian geologists appointed by the surveys of the two countries to decide upon a suitable nomenclature for the pre-Cambrian formations of the Upper Lakes. The number concludes with an interesting editorial on the revival of the Illinois Geological Survey.

THE April number (volume 7, number 2) of the *Transactions of the American Mathematical Society* contains the following articles:

C. E. STROMQUIST: 'On geometries in which circles are the shortest lines.'

G. A. BLISS: 'A generalization of the notion of angle.'

OSWALD VEBLEN: 'The square root and relations of order.'

EDWARD KASNER: 'The problem of partial geodesic representation.'

R. P. STEPHENS: 'On the pentadeltoid.'

G. A. MILLER: 'The groups of order p_m which contain exactly p cyclic subgroups of order p^α.'

W. A. MANNING: 'Groups in which a large number of operators may correspond to their inverses.'

OSWALD VEBLEN and W. H. BUSSEY: 'Finite projective geometries.'

W. B. FORD: 'On the analytic extension of functions defined by double power series.'

L. E. DICKSON: 'On quadratic, hermitian and bilinear forms.'

PAUL STÄCKEL: 'Die kinematische Erzeugung von Minimalflächen.'

OSKAR BOLZA: 'A fifth necessary condition for a strong extremum of the integral $\int_{x_0}^{x_1} F(x, y, y')\,dx$.'

G. A. BLISS and MAX MASON: 'A problem in the calculus of variations in which the integrand is continuous.'

THE April number (volume 12, number 7) of the *Bulletin of the American Mathematical Society* contains: Report of the February Meeting of the Society, by F. N. Cole; Report of the Fifty-fifth Annual Meeting of the American Association for the Advancement of Science, by L. G. Weld; 'A Proof of the Fundamental Theorem of Analysis Situs,' by G. A. Bliss; 'Determination of Associated Surfaces,' by Burke Smith; 'Note on the Practical Application of Sturm's Theorem,' by J. E. Wright; 'The Movement for Reform in the Teaching of Mathematics in Prussia,' by J. W. A. Young; Review of Jahnke's Vorlesungen über die Vektorenrechnung, by E. B. Wilson; Review of Moulton's Introduction to Celestial Mechanics, by A. O. Leuschner; Shorter Notices: Borel's Géométrie, Premier et Second Cycle, by C. L. E. Moore; Schüssler's Orthogonale Axonometrie, by Virgil Snyder; 'Notes' and 'New Publications.'

The May number of the *Bulletin* contains: Report of the February Meeting of the San Francisco Section, by G. A. Miller; 'An Application of the Theory of Differential Invariants to Triply Orthogonal Systems of Surfaces,' by J. E. Wright; 'Surfaces generated by Conics cutting a twisted Quartic Curve and an Axis in the Plane of the Conic,' by Virgil Snyder; 'Operation Groups of Order $p_1^{m_1\mu_1} p_2^{m_2\mu_2}$,' by O. E. Glenn; 'A Definition of Quaternions by Independent Postulates,' by Miss R. L. Carstens; 'Note on the Heine-Borel Theorem,' by N. J. Lennes; Review of Borel's Leçons sur les Fonctions de Variables Réelles, by J. W. A. Young; Shorter Notices: Hawkes's Advanced Algebra, by G. D. Olds, Brioschi's Works, by H. S. White,