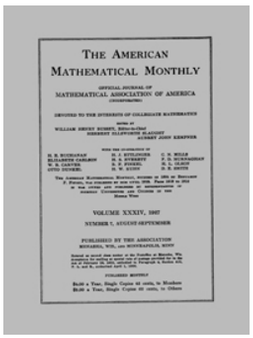

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H. T. Davis (Secretary)

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C. H. YEATON, *Assistant Secretary*

THE FOURTH MEETING OF THE INDIANA SECTION

The fourth annual meeting of the Indiana Section of the Mathematical Association of America was held April 29–30, 1927 at DePauw University, Greencastle, Ind.

There were thirty present, including the following seventeen members of the Association:

W. C. Arnold, Gladys L. Banes, G. E. Carscallen, H. T. Davis, S. C. Davisson, J. E. Dotterer, W. E. Edington, P. D. Edwards, H. E. H. Greenleaf, F. H. Hodge, E. N. Johnson, Juna M. Lutz, T. E. Mason, C. K. Robbins, K. P. Williams, H. E. Wolfe, W. A. Zehring.

On Friday evening there was a banquet at which were present members of the Association and representatives from many of the science departments of the university. Professor W. M. Blanchard of the department of chemistry acted as toastmaster. At eight o'clock a public lecture, under the auspices of the Naperian Club and the Physics Seminar of DePauw University, was given by Professor Jakob Kunz, Professor of physics, University of Illinois, on the subject, "A popular review of the trend of modern physical science." The introduction was made by Professor O. H. Smith of the physics department of DePauw University. Professor Kunz first presented a picture of physics as it existed near the beginning of the present century as a result of the fundamental work of Faraday, Maxwell, Helmholtz, Kelvin and others. A set of principles had been formulated which seemed to establish an almost perfect foundation for an exact science. There were certain unsatisfactory features in this formulation, however, as, for example, the concept of action at a distance, the idea of an ether which was metaphysical rather than physical, and the second law of thermodynamics which makes no provision in nature for the re-creation of energy. During the last thirty years, all of our ideas have been undergoing a change. The classical foundations of physics have been attacked by fundamental experiments. The theory of relativity has replaced Newton's absolute space and time by a relative space and time. The Bohr theory of the atom has replaced the concept of a continuous flow of energy by a discontinuous flow of

energy and left the concept of the ether in a precarious state. In an attempt to reconcile theory with experiment, physicists have been led to replace the mechanical models of the last century by mathematical formulas. To show the extent to which this has been done the speaker cited the recent matrix quantum theory where infinite matrices have replaced physical intuition based upon mechanical analogies.

The meeting on Saturday was presided over by Professor E. N. Johnson of Butler College, chairman of the section. There was a short business meeting at which the following officers were elected: Chairman, Professor J. E. DOTTERER, Manchester College; Vice-chairman, Professor E. D. GRANT, Earlham College; Secretary-treasurer, Professor H. T. DAVIS, Indiana University.

A chairman's address was made by Professor Johnson on the subject, "A plea for the history of mathematics." Professor Johnson pointed out that no subject loses so much as mathematics when it is separated from its history. Numerous historical allusions were made to show how teaching can be aided by a knowledge of the struggles that underlie the growth of mathematical ideas. The address concluded with recommendations that the state board of education be petitioned to reduce its requirements in education and to increase its requirements in mathematics for mathematics teachers, this increase to include the history of mathematics as a required subject. Upon motion a committee was appointed to act on this suggestion and appropriate recommendations were adopted by the section.

The following papers were presented:

1. "A study of the reliability of certain types of mathematical tests," by Professor W. E. EDINGTON, Purdue University.

2. "A study in correlation of college grades, intelligence test grades, and personality ratings" by Mr. J. H. SHOCK, Purdue University. (Introduced by Professor F. H. Hodge).

3. "Function-theoretic determination of the area of a triangle" by Professor K. P. WILLIAMS, Indiana University.

4. "Laplace's calculus of generatrix functions" by Miss IRENE PRICE, Indiana University. (Introduced by Professor Davis).

5. "Some elementary properties of tensors" by Professor P. D. EDWARDS, Ball Normal School.

6. "A survey of methods for the inversion of integrals of Volterra type" by Professor H. T. DAVIS, Indiana University.

7. "Note on the validity of the formula for the standard deviation of a sum" by Professor W. E. EDINGTON, Purdue University.

Abstracts of the papers follow, the numbers corresponding to the numbers in the list of titles.

1. The reliability of a series of tests given to classes in freshman and sophomore college mathematics has been investigated by means of the correlation and Brown-Spearman formulas. The tests are of the essay type, the recall and the recognition types, and combinations of these types; they were given in fifty-minute and three-hour time periods. As is to be expected, the tests in formal differentiation and integration show moderately high reliability, whereas tests involving essay problems show a wide variation in reliability. The results of this study also suggest a method of testing the reliability of the teaching of the various mathematical topics by the instructor.

2. In this paper Mr. Shock computed the coefficient of correlation between college grades and intelligence grades, between college grades and personality estimates, and between intelligence grades and personality estimates, for one hundred Purdue seniors chosen at random. He found the correlation between college grades and the personality estimates to be the highest and the correlation between the intelligence grades and the personality estimates to be the lowest.

3. Professor Williams's paper appears in this number of the MONTHLY.

4. Laplace published in 1779 the method of generatrix functions which he made the foundation of his theory of probability. The principles of the method in their simplest form consist in treating the successive values of any function as the coefficients in the expansion of another function with reference to a second variable. The latter is called the generatrix function of the former. A direct and inverse calculus is thus created. Miss Price showed how this calculus may be used in the theory of interpolation, in the transformation of series, and in the expansion of functions and their differences into series. By means of the calculus of Laplace, the approximate value of an expression containing a great many terms may be found. Application was made to the evaluation of integrals found in the theory of probability.

5. The paper of Professor Edwards dealt with the definitions of contravariant tensors as extensions of the two types of vectors arising from the differentiation of the differentials dx_μ and the gradient of an invariant. The elementary properties of these tensors were considered with the laws of operation and the significance of covariant differentiation.

6. Professor Davis made a survey of the methods used to solve the Volterra integral equation of the first kind. The first part of the paper considered the case of the general kernel $K(x, y)$ and showed, in particular, the existence of singularities analogous to the regular and irregular singular points of linear differential equations. The second part of the paper dealt with a number of special methods that have been devised for solving the equation with a kernel of the form $K(x-y)$.

7. In a series of m sets of n items or measurements, it is well known that $\sigma_A=\sigma/\sqrt{n}$ and $\sigma_s=\sqrt{(\sigma_1^2+\sigma_2^2+\cdots+\sigma_m^2)}$, where σ_A is the standard deviation of the average, σ the standard deviation of the mn items, σ_s the standard deviation of the sum, and σ_i $(i=1, 2, \cdots, m)$, the standard deviation of the m sets. These formulas depend for their validity on the assumption that n is sufficiently large so that the sums of the product terms approach zero. In this paper Professor Edington determined the relation $\sigma_s^2=m(1-n^{-1})\sigma^2=m(n-1)\sigma_A^2$, which affords a check on the validity of the use of the formulas for σ_s and σ_A when n is not large.

At the conclusion of the meeting, a vote of appreciation was extended to the department of mathematics, the Naperian Club, and the Physics Seminar of DePauw University. The time and place of the next meeting was left in the hands of the executive committee.

H. T. DAVIS, *Secretary*

THE MAY MEETING OF MARYLAND–VIRGINIA–DISTRICT OF COLUMBIA SECTION

The twenty-first meeting of the Maryland-Virginia-District of Columbia Section of the Mathematical Association was held on Saturday, May 7, 1927, at the University of Maryland, College Park, Maryland, the morning session opening at 11 A.M. and the afternoon session at 2:30 P.M. Those attending the meeting were guests of the University of Maryland at luncheon between the sessions, and also were guests at various athletic events before and after the sessions. Chairman J. A. Bullard presided at both sessions.

There were 53 present including the following 38 members of the Association: O. S. Adams, R. N. Ashmun, H. G. Avers, L. M. Blumenthal, C. C. Bramble, J. A. Bullard, P. Capron, A. Cohen, G. R. Clements, J. A. Duerksen, P. J. Federico, G. L. Fentress, M. Goldberg, H. Gwinner, W. M. Hamilton, G. W. Hansen, P. E. Hemke, H. P. Kaufman, G. H. Keulegan, W. D. Lambert, A. E. Landry, F. Morley, F. D. Murnaghan, J. R. Musselman, J. W. Peters, E. C. Phillips, O. J. Ramler, C. H. Rawlins, Jr., J. N. Rice, A. W. Richeson, R. E. Root, J. H. Schad, J. T. Spann, T. H. Taliaferro, A. A. Tomeldon, J. Tyler, P. Wernicke, E. W. Woolard.

The following program was presented:

1. "The problem of three vortices" by Prof. F. MORLEY, Johns Hopkins University.

2. "Euclidean invariants of the plane cubic" by P. J. FEDERICO and P. R. NEFF, U. S. Patent Office.

3. "Lagrange resolvents in Euclidean geometry" by L. M. BLUMENTHAL, Johns Hopkins University.