The May Meeting of the Indiana Section

H. T. Davis (Secretary)

the Gaussian scale corresponding to the individual animals considered as the extreme individuals in a frequency distribution of a large population.

BESSIE I. MILLER, *Secretary-Treasurer.*

THE MAY MEETING OF THE INDIANA SECTION.

The second meeting of the Indiana Section of the Mathematical Association of America was held May 8-9, 1925, at Indiana University, Bloomington, in connection with the visit of Professor J. HADAMARD of Paris to this institution.

There were forty-three present including the following thirty members of the Association: R. J. Aley, Gladys L. Banes, C. F. Barr, J. C. Bennett, E. M. Berry, H. T. Davis, S. C. Davisson, C. S. Doan, J. E. Dotterer, W. E. Edington, E. D. Grant, G. H. Graves, J. Hadamard, L. Hadley, U. S. Hanna, C. T. Hazard, Cora B. Hennel, F. H. Hodge, E. N. Johnson, J. J. Knox, Florence Long, Juna M. Lutz, Wm. Marshall, T. E. Mason, G. E. Moore, C. K. Robbins, D. A. Rothrock, K. P. Williams, H. E. Wolfe, H. N. Wright.

On Friday evening the visiting members were present at a joint dinner of the Indiana and Purdue sections of the American Association of University Professors.

At eight o'clock Professor Hadamard gave an address under the auspices of the ⌐:diana chapter of Sigma Xi on the subject: "The equilibrium of the solar sy⌐ ⌐m, past and future." The introduction was made by Professor S. C. ⌐avisson of Indiana University.

Professor Hadamard first discussed the nature of the motions of the planets of the solar system and pointed out that the greatest cause for perturbations in the orbits of the planets is the mass of Jupiter. Although these disturbances are largely compensating, there still remains a small residual disturbance which may ultimately lead to the disintegration of the solar system. The speaker showed how the study of this problem can be based upon geometrical analogy.

The program Saturday morning consisted of an address by Professor Hadamard on the subject: "The modern notion of a function." The speaker first showed how the notion of functional relationship soon outgrew Euler's definition of "functio continua." He then pointed out that analytic functions, as a class, possess three fundamental properties. First: they can be represented by means of formal expressions. Second: they possess the group property, *i.e.*, that an analytic function of an analytic function is again an analytic function. Third: they possess the property of continuation. The speaker then inquired whether other classes of functions might not exist which would fail to have one or more of these properties, but would still possess the others. Such a class is furnished by those functions which admit the limitation $|f^{(n)}| < k^n (an)!$ $a > 1$. Functions thus characterized arise in the parabolic case of the boundary-value problem of partial differential equations and are called *quasi-analytic*. As a class, they fail to possess the third property of analytic functions. The work of Gevrey, Denjoy and Carleman was quoted.

After a short business session presided over by the chairman, Professor F. H. Hodge of Purdue University, adjournment was taken to the university cafeteria where a luncheon was served to the members and their guests.

The afternoon program consisted of the following papers:

1. "Characteristic errors in the algebra of college freshmen" by Mr. C. F. BARR of Purdue University.

2. "A simple demonstration of some lemmas of Jensen" by Professor K. P. WILLIAMS of Indiana University.

3. "What college teachers can do to improve the quality of mathematics in the secondary schools" by Professor J. E. DOTTERER of Manchester College.

4. "The solution of triangles from an algebraic point of view" by Professor C. K. ROBBINS of Purdue University.

5. "Projective geometry as an undergraduate study" by Professor H. N. WRIGHT of Earlham College.

6. "The history and present status of integral equations" by Professor H. T. DAVIS of Indiana University.

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

1. Mr. Barr presented the results of a statistical study of characteristic errors in the algebra of college freshmen based on the results of an examination of several hundred semester examination papers. The solution of linear simultaneous equations in two unknowns appears to be the easiest problem for freshmen, while the simplification of continued fractions and the determination of parameters present the greatest difficulty.

2. In his paper Professor Williams gave a simple and direct demonstration of the lemmas that form the basis for some of Jensen's theorems on analytic functions.

3. Professor Dotterer made a plea for a better supervision of the preparation of high school teachers of mathematics and suggested the coöperation of the Indiana Section of the Association with the State Board of Education. Upon motion, the chairman was instructed to appoint a committee to study the problem and present suggestions to the state board.

4. In the case of plane triangles Professor Robbins assumed the law of sines and then used the system: (1) $b/a = \sin B/\sin A$, (2) $c/a = \sin C/\sin A$, (3) $A + B + C = \pi$, to obtain by purely algebraic means the other formulas used in plane trigonometry. A similar derivation of the formulas of spherical triangles was made.

5. Professor Wright stated that an examination of the courses of study of a number of the leading colleges and universities of the country shows that courses for undergraduates in synthetic projective geometry are offered in about half of them. In this subject, better than any place in the usual undergraduate course, there is available to the student of elementary mathematics a most interesting presentation of some of the great concepts and unifying principles of geometry.

It should be included in the training of all prospective teachers and majors in mathematics.

6. The paper of Professor Davis, based upon a bibliography of 500 titles, traced the development of integral equations during the twenty-five-year period since the appearance of Fredholm's first paper in 1900.

The time and place of the next meeting were left for the decision of the executive committee.

H. T. DAVIS, *Secretary.*

THE DECEMBER MEETING OF THE MARYLAND-VIRGINIA-DISTRICT OF COLUMBIA SECTION.

The sixteenth regular meeting of the Maryland-Virginia-District of Columbia Section was held at Johns Hopkins University, Baltimore, Md., on December 6, 1924. The members were the guests of the University at luncheon. There were two sessions; Dr. F. D. Murnaghan presided at each session.

The attendance was forty-five including the following thirty-two members of the Association: O. S. Adams, R. N. Ashmun, H. G. Avers, Clara L. Bacon, W. W. Bigelow, G. A. Bingley, C. C. Bramble, J. A. Bullard, P. Capron, G. R. Clements, A. Cohen, J. B. Eppes, H. Gwinner, W. M. Hamilton, L. S. Hulburt, W. D. Lambert, A. E. Landry, Florence P. Lewis, E. S. Mayer, F. D. Murnaghan, J. R. Musselman, C. A. Nelson, C. H. Rawlins, Jr., J. N. Rice, H. M. Robert, Jr., A. C. Robinson, H. A. Robinson, R. E. Root, G. A. Ross, J. B. Scarborough, Elizabeth W. Wilson, E. W. Woolard.

The following nine papers were read:

(1) "The slighted pyramid" by Professor HARRY GWINNER, Vice Dean, University of Maryland.

(2) "Needs of symbols for partial and total differential coefficients" by Professor A. COHEN, Johns Hopkins University.

(3) "On the Jonquières curve" by Dr. C. A. NELSON, Johns Hopkins University.

(4) "The distance between two points on an ellipsoidal earth" by Mr. W. D. LAMBERT, U. S. Coast and Geodetic Survey.

(5) "The summation method for the determination of the Pearsonian coefficient of correlation" by Miss ELIZABETH W. WILSON of the Central High School, Washington, D. C.

(6) "Parametric equations of the perimeter of regular polygons" by Dr. O. S. ADAMS, U. S. Coast and Geodetic Survey.

(7) "A geometrical discussion of right-angled triangles with integral sides" by Mr. R. L. CARY of Baltimore, Md.

(8) "A laboratory course in mathematics" by Professor R. E. ROOT, U. S. Naval Academy.

(9) "A mathematical instruments laboratory" by Professor C. C. BRAMBLE, U. S. Naval Academy.