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The May Meeting of the Indiana Section

J. C. Polley (Secretary)

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concepts of general educational worth now found in later years of high school mathematics that should be brought down into ninth or tenth year mathematics. Eventually, through experimental work, the committee hopes to develop new and better high school mathematics courses.

Miss Seybold then mentioned the core curriculum as a teaching trend not suitable for mathematics instruction and introduced the plan for college admission in bulletin No. 9 of the Illinois Curriculum Program, the objective of which plan is to make way for experimental high school courses.

A report by Mr. Edgar Leach on his work as a member of the Steering Committee of the Illinois Curriculum Program was read.

Dr. E. L. Welker analyzed Volume IV, *"Did They Succeed in College?"*, by Chamberlin and Chamberlin of the reports on the Eight Year Study, which study is often quoted as having proved that the pattern of subjects a student takes in high school has no effect upon his college success. Dr. Welker stated that in his opinion the study was not valid and that the statistical techniques were highly inadequate.

Professor Gertrude Hendrix spoke on difficulties in implementing the college admission plan in bulletin No. 9. She pointed out confusion and incompleteness in implementation of the proposed admission plan and gave the results of a study at Eastern Illinois State College. Of a total of 2002 freshman admissions, 1947-50, the number of survivors is 886 or 44%. Of seventy freshman admissions on General Educational Development tests in the same period only ten students, or 14%, survive, and some of these ten may not graduate.

Professor Seybold then called on Professor Cairns to speak informally. Dr. Cairns described the rising concern of people both inside and outside of Illinois over the problem of the poor preparation for life and for college which so many children are now receiving in school. A discussion followed during which resolutions were adopted. A committee will be appointed to implement these resolutions.

E. C. KIEFER, *Secretary*

THE MAY MEETING OF THE INDIANA SECTION

The twenty-ninth annual meeting of the Indiana Section of the Mathematical Association of America was held at Indiana University, Bloomington, Indiana, on May 3, 1952. Two sessions were held at which Professor M. W. Keller of Purdue University, Chairman of the Section, presided.

There were fifty-nine in attendance including the following thirty-nine members of the Association:

Juna L. Beal, L. G. Black, Stanley Bolks, C. F. Brumfiel, G. E. Carscallen, W. W. Chambers, H. E. Crull, R. E. Dowds, W. E. Edington, P. D. Edwards, R. E. Ekstrom, E. L. Godfrey, S. H. Gould, G. H. Graves, H. E. H. Greenleaf, J. R. Hadley, Ralph Hull, M. W. Keller, Florence Long, Saunders MacLane, D. S. Merrilees, G. T. Miller, J. A. Nickel, P. W. Overman, T. P. Palmer, J. C. Polley, D. H. Porter, Arthur Rosenthal, R. M. Ross, J. F. Schell, C. P. Sousley, Anna K. Suter, T. Y. Thomas, Jane A. Uhrhan, M. S. Webster, K. P. Williams, H. E. Wolfe, R. C. Wrede, J. W. T. Youngs.

The following officers were elected: Chairman, Professor M. A. Zorn, Indiana University; Vice-Chairman, Professor C. P. Sousley, Rose Polytechnic Institute.

The annual meeting of 1953 will be held at Ball State Teachers College, Muncie, Indiana, on May 2.

The following papers were presented:

1. *On two topics in advanced calculus*, by Professor George Whaples, Indiana

University, introduced by Professor H. E. Wolfe.

Simple methods are outlined for deriving trigonometry from the differential equation satisfied by the sine function and for proving the theorems on implicit functions by use of sequences of linear approximations.

2. *Conics among the Greeks*, by Professor S. H. Gould, Purdue University.

After a brief discussion of some examples of conics in literature and art, and of the exact meaning of the names, parabola, hyperbola, and ellipse, the speaker undertook to show that every modern definition of a conic appears, in more or less explicit form, in the works of the Greek mathematicians.

3. *An elementary derivation of the formula of Foucault*, by Professor P. D. Edwards, Ball State Teachers College.

Draw a circle in a plane tangent to the surface of the earth and sufficiently small that the radius may be considered either as a straight line or an arc of a great circle of the earth. Due to the rotation of the earth the points of the circle farthest from the pole move toward the East faster than the center. By familiar formulas of trigonometry it is shown that this difference in speed gives a relative motion about the center that is identical with the formula of Foucault. The only advantage of the method is that it can be understood by students who are studying trigonometry, whereas the development of the Foucault formula by the usual methods of dynamics involves rather difficult differential equations.

4. *Some elementary principles of circulates in different number scales*, by Professor E. L. Godfrey, Defiance College.

An experimental study of a tabulation of the circulates of the reciprocals of prime numbers expressed in successive scales of notation suggested an arrangement for each prime, p , of its circulates into $p-1$ groups. In each of these groups there is a constant difference between the corresponding digits of the circulates for radix r and $r+p$. The digits of this difference were shown to be equal to the successive powers of r modulo p . A discussion of some of the further properties of these differences resulting from experimental study included some suggestions concerning the possible use of such studies in the teaching program.

5. *Unified theories of relativity*, by Professor Vaclav Hlavaty, Indiana University, introduced by Professor H. E. Wolfe.

The speaker presented a brief outline of different attempts to obtain the unified theory of relativity (Weyl, Kaluza, Schrödinger) and the solution of Einstein's basic problems of the theory.

6. *Homological algebra*, by Professor Saunders MacLane of the University of Chicago, President of the Association. (By invitation.)

Recent developments in algebraic topology and in the homology theory of groups and of other algebraic systems indicate the existence of a new branch of algebra which may be dubbed "homological algebra." A preliminary notion of this subject, that of the kernel and the image of a homomorphism, may be illustrated even in the simple examples, such as the homomorphism $x \rightarrow e^{2\pi i x}$ of the additive group of reals into the multiplicative group of complex numbers. In this connection, the notion of an exact sequence of groups and homomorphisms is introduced, and the 5-lemma for such exact sequences is established.

The central concept of homological algebra is that of a differential group A , composed of an abelian group A and a homomorphism $\partial: A \rightarrow A$ with $\partial\partial=0$. Each such differential group determines a homology group $H(A)$, defined as the quotient of the kernel of ∂ by the image of ∂ . If A has a differential subgroup A' , this determines a quotient differential group $\bar{A} = A/A'$; the asso-

ciated sequence $H(A') \rightarrow H(A) \rightarrow H(\bar{A}) \rightarrow H(A') \rightarrow \dots$ is exact. If a homomorphism f of A with subgroup A' into a second differential group B with subgroup B' induces isomorphisms on $H(A')$ and $H(\bar{A})$, the 5-lemma may be used to prove that f also induces an isomorphism of $H(A)$ to $H(B)$. It was indicated how this and similar results may be used to establish the equivalence of different definitions of homology theories for various types of mathematical systems.

J. C. POLLEY, *Secretary*

THE MAY MEETING OF THE METROPOLITAN NEW YORK SECTION

The eleventh annual meeting of the Metropolitan New York Section of the Mathematical Association of America was held at Hofstra College, Hempstead, New York, on May 3, 1952. Mr. E. I. Shapiro, Vice-Chairman of the Section, presided at the morning session, and Professor James Singer, Chairman of the Section, presided at the afternoon session.

One hundred fifty-one persons attended the sessions, including the following eighty-four members of the Association:

R. G. Archibald, I. L. Battin, Brother Bernard Alfred, W. W. Bessell, Samuel Borofsky, C. B. Boyer, Benjamin Braverman, A. B. Brown, Charlotte Brown, J. H. Bushey, Jewell H. Bushey, P. J. Cocuzza, L. W. Cohen, T. F. Cope, W. H. H. Cowles, I. A. Dodes, J. N. Eastham, J. E. Eaton, W. H. Fagerstrom, A. B. Farnell, J. M. Feld, Daniel Finkel, Edward Fleisher, William Forman, R. M. Foster, B. P. Gill, A. J. Goldman, I. L. Goldman, Bernard Greenspan, Harriet M. Griffin, Carl Hammer, Frank Hawthorne, G. C. Helme, H. H. Hinman, E. Marie Hove, R. J. Jaeger, Jr., D. B. Jordan, L. S. Kennison, G. A. Keyes, E. R. Kiely, H. S. Kieval, M. S. Klamkin, David Kotler, Edna Kramer-Lasser, H. C. Kranzer, C. H. Lehmann, M. E. Levenson, Walter Littman, E. R. Lorch, W. A. Lucas, J. D. Matheson, G. J. Mazzara, F. H. Miller, Morris Morduchow, A. J. Mortola, G. R. Mott, A. F. Nickl, C. J. Oberist, L. F. Ollmann, Martin Orr, J. J. Quinn, M. R. Reeks, Moses Richardson, Selby Robinson, N. J. Rose, H. D. Ruderman, J. P. Russell, J. B. Ryan, John Salerno, Charles Salkind, Arthur Sard, A. H. Sarno, Abraham Schwartz, Aaron Shapiro, E. I. Shapiro, James Singer, F. E. Smith, E. R. Stabler, Mildred M. Sullivan, R. L. Swain, L. F. Tolle, A. W. Tucker, J. A. Vollkommer, Sue R. Waldman.

The officers elected at the business meeting were: Chairman, Professor L. F. Ollmann, Hofstra College; Collegiate Vice-Chairman, Professor W. H. Fagerstrom, The College of the City of New York; High-School Vice-Chairman, Mr. H. D. Ruderman, Manhattan High School of Aviation Trades; Secretary, Dr. H. S. Kieval; Treasurer, Mr. Aaron Shapiro, Midwood High School.

At the business meeting, the following report on the activities of the Committee on Contests and Awards was given by its chairman, Professor W. H. Fagerstrom: "The Committee on Contests and Awards of the Metropolitan New York Section of the Mathematical Association of America enlarged its area of operation this year to include the state of Connecticut along with its own area which includes southern New York, Long Island, and northern New Jersey. In addition, the University of Oregon and the University of British Columbia conducted their own contests but used the questions of the Metropolitan New York Section. One hundred thirty-three invitations were sent out to the larger high schools in the other 44 states of the union, not more than four invitations going to any one state. The registration of 39 schools from 29 states was most gratifying. There were 295 schools registered for the contest and