ABC, mid-way between D_h and the orthocenter H_d of the triangle ABC. (4) The centroid of the triangle UD_hH_d coincides with the centroid of ABC. (5) The projection, upon ABC, of the vertex of the twin tetrahedron (T') of (T) which corresponds to D is the diametric opposite of M on the nine-point circle of the triangle ABC.

5. Professor Schorling considered the following topics: (1) The needs of secondary pupils as regards basic skills in mathematics. (2) The contribution of courses in the mathematics of the secondary school to the general reader. (3) The need for mathematics in the introductory courses in science of the secondary school. (4) The basic concepts and principles to be included in mathematics that are to contribute to general education.

J. C. BRIXEY, *Secretary*

SIXTEENTH ANNUAL MEETING OF THE INDIANA SECTION

The sixteenth annual meeting of the Indiana Section of the Mathematical Association of America was held Friday and Saturday, April 28 and 29, 1939, at Ball State Teachers College, Muncie, Indiana.

Seventy-four registered at the meetings including the following twenty-five members of the Association: Emil Artin, Juna Lutz Beal, W. D. Cairns, J. E. Dotterer, Olive M. Draper, P. D. Edwards, W. R. Hardman, Cora B. Hennel, F. H. Hodge, L. P. Hutchison, M. W. Keller, D. A. Lehman, Florence Long, H. A. Meyer, D. H. Porter, H. R. Pyle, C. K. Robbins, L. S. Shively, D. R. Shreve, W. O. Shriner, Anna K. Suter, M. S. Webster, Agnes E. Wells, K. P. Williams, H. E. Wolfe.

At the business session on Saturday morning the following officers were elected for next year: Chairman, L. S. Shively, Ball State Teachers College; Vice-Chairman, Cora B. Hennel, Indiana University; Secretary, P. D. Edwards, Ball State Teachers College. The seventeenth annual meeting will be held at Earlham College, Richmond, Indiana.

Professor K. P. Williams made a report for the committee appointed to encourage and recognize superior preparation for the teaching of mathematics. On the basis of an examination conducted April 23, 1938, and April 22, 1939, a Certificate of Merit in Mathematical Preparation was awarded to Charles F. Brumfield of Ball State Teachers College, and to Richard E. Dietrich of Indiana University.

The annual dinner was held jointly with the Xi chapter of Sigma Zeta Honorary Science and Mathematics Society. Mr. James Findling, President of Xi chapter, served as toastmaster and introduced President L. A. Pittenger of Ball State Teachers College, who welcomed the visitors.

Following the dinner the first session of the Section was held, at which time Professor W. D. Cairns of Oberlin College gave an illustrated lecture on "The rôle of mathematics in seismology." Professor Cairns described the probable cause of earthquakes, the three main types of waves, the mathematical evidence

for their paths through or about the earth, the consequent deductions as to the nature of the earth's interior, including the conclusions as to the discontinuities in the earth's structure. He explained the theory of seismometers. Further topics which involved mathematical treatment were the correspondence between displacements on the instrumental records and displacements of the earth which these records are meant to give, the method of least squares in connection with the travel-time curves, and the consistency of various estimates of the earth's interior.

At the two sessions on Saturday the following program was given:

1. "Problem making" by Professor C. K. Robbins, Purdue University.
2. "Order relation in fields" by Professor Emil Artin, Indiana University.
3. "Some technical aspects of the mathematics of seismology" by Professor W. D. Cairns, Oberlin College.
4. "On the foundations of mathematics" by D. O. Schechter, Manchester College, introduced by Professor Dotterer.
5. "The generalization of the Eckhardt point" by Dr. D. R. Shreve, Purdue University.
6. "The general second degree equation without transformation of coördinates" by Professor K. P. Williams, Indiana University.
7. "A certain Lagrange interpolation formula" by Dr. M. S. Webster, Purdue University.

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

1. Professor Robbins discussed the matter of the construction of problems which would be suitable for textbook material. Several problems of different types were discussed. Among these was one consisting of two curves, each having rational coefficients so determined that the common tangents to the two curves have rational coefficients and are tangent at points whose coördinates are rational. Other interesting examples were given from the field of differential equations.

2. Hilbert's problem to characterize all geometric construction that can be carried out by means of ruler and compasses only, leads to the question, what elements of a field can be represented as a sum of squares? Professor Artin showed that if the element -1 is the sum of squares of elements of a field, then every element of the field is the sum of squares of elements of the field. So the interesting case is that of a field in which -1 is not a sum of squares. Such a field is called a real field. It can be shown that the real fields are identical with fields in which one can establish an order. An element of a real field is a sum of squares if, and only if, it is positive in whatever way one might order the field.

3. Professor Cairns gave a more technical consideration to those mathematical topics which could not be adequately treated in the general lecture of Friday evening.

4. Mr. Schechter discussed the three schools of thought that have been interested in the investigation of the foundation of mathematics, the formal, the

logical, and the postulational. The program as presented by each school was considered and the three schools were compared as to the actuality of the foundations, subject matter, method and structure, and consistency. From these comparisons, general conclusions were made concerning the nature of mathematics.

5. The generalized Eckhardt point was defined by Dr. Shreve, and two theorems of Eckhardt were given. The multiplicity of the Eckhardt point on the Hessian of the surface was determined; the configuration of Eckhardt points on the Segre Cubic Variety was discussed in detail.

6. The paper of Professor Williams considered the problems involved in the direct reduction of the equation

$$Ax^2 + By^2 + 2Hxy + 2Cx + 2Dy + E = 0$$

to the form

$$(x - \alpha)^2 + (y - \beta)^2 = e^2 \frac{(ax + by + c)^2}{a^2 + b^2}.$$

7. Dr. Webster discussed the Lagrange interpolation polynomial

$$l_k^{(n)}(x) \equiv \phi_n(x)/[(x - x_k)\phi_n'(x_k)],$$

where

$$\phi_n(x) \equiv (x - x_1)(x - x_2) \cdots (x - x_n), \qquad x_k = \cos [k\pi/n + 1].$$

He proved that in the interval $(-1, 1)$ the maximum of the absolute value of $l_k^{(n)}(x)$ is less than 2. This is the best possible inequality for all n and k.

P. D. EDWARDS, *Secretary*

THE APRIL MEETING OF THE KANSAS SECTION

The twenty-fifth annual meeting of the Kansas Section of the Mathematical Association of America was held at the High School in Topeka, on Saturday, April 1, 1939. In the morning there was a joint session with the Kansas Association of Teachers of Mathematics, of which most members of the Section are also members. After the social hour and the luncheon, the two organizations met for separate programs. Professor C. B. Tucker, chairman of the Section, presided at the morning session as well as at the Section meeting.

The attendance was one hundred sixty-one, among whom were the following thirty-four members of the Association: Sister Ann Elizabeth, Sister Mary N. Arnoldy, Wealthy Babcock, E. A. Beito, Lois E. Bell, Florence L. Black, E. E. Colyer, R. D. Daugherty, Lucy T. Dougherty, W. H. Garrett, W. A. Harshbarger, A. J. Hoare, Emma Hyde, H. E. Jordan, C. F. Lewis, W. H. Lyons, Anna Marm, U. G. Mitchell, Thirza Mossman, O. J. Peterson, P. S. Pretz, G. B. Price, C. B. Read, B. L. Remick, D. H. Richert, J. A. G. Shirk,