THE TWELFTH ANNUAL MEETING OF THE ROCKY MOUNTAIN SECTION

The twelfth annual meeting of the Rocky Mountain Section of the Mathematical Association of America was held at the Colorado School of Mines, Golden, Colorado, on April 20–21, 1928. There were fifty-five present including the following twenty-five members of the association: Ralph Beatley, A. G. Clark, E. A. Cummings, I. M. DeLong, J. R. Everett, G. W. Finley, Philip Fitch, J. C. Fitterer, G. W. Gorrell, C. A. Hutchinson, A. J. Kempner, Claribel Kendall, A. J. Lewis, G. H. Light, E. P. Martinson, S. L. Macdonald, Margaret McGinley, J. Q. McNatt, W. K. Nelson, O. H. Rechard, W. J. Risley, Mary S. Sabin, C. H. Sisam, E. B. Stouffer, C. W. Wray.

The section voted to hold its next annual meeting at the Colorado Teachers' College, Greeley, Colorado. The following officers were elected: G. W. FINLEY, chairman; G. W. GORRELL, vice-chairman; PHILIP FITCH, secretary, G. H. LIGHT, treasurer.

At a complimentary dinner given by the School of Mines on Friday, President Coolbaugh delivered an address of welcome to which Professor G. W. Finley made the response. The section was favored Friday evening by an address, "Mathematics in Italian Universities" by Professor E. B. Stouffer of the University of Kansas. Professors DeLong and Gorrell gave brief talks on the life and work of the late Professor H. E. Russell.

The following fourteen papers were read:

1. "A problem" by Mr. J. Q. MCNATT.

2. "The intersection of two special ruled cubics" by Professor SAUL POLLOCK (by invitation).

3. (a) "A method of solving quadratics" and (b) "A model for trigonometric functions" by Mr. J. W. HAZARD (by invitation).

4. "Teaching mathematics by subjects or topics" by Professor G. W. GORRELL.

5. "Note on the convergence of an infinite series" by Professor C. A. HUTCHINSON.

6. "Teaching engineering mathematics to the poor student" by Professor J. R. EVERETT.

7. "An interpretation of the imaginary resulting from an application of the principle of continuity" by Mr. PHILIP FITCH.

8. "The use of the discriminant in solving a certain type of differential equation" by Professor G. H. LIGHT.

9. "Mathematics and the Society for the Promotion of Engineering Education" by Professor J. W. RISLEY.

10. "Remarks on a question raised by Hessenberg" by Professor A. J. KEMPNER.

11. "On a special quartic surface with a double line" by Professor C. H. SISAM.

12. "Cocoanuts and congruence" by Professor RALPH BEATLEY.

13. "Some fundamental concepts in differential projective geometry" by Professor E. B. STOUFFER.

14. "Civic values in the study of mathematics" by Professor A. S. ADAMS (by invitation).

At the close of the Friday afternoon session, Dr. C. A. Heiland gave an explanation of the apparatus used in geophysics for the purpose of locating bodies of ore and oil.

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

In his address on "Mathematics in Italian universities," Professor Stouffer told of various experiences in connection with his study of mathematics in Italy during the year 1926–27. Special mention was made of the mathematics curricula in Italian universities and of the character of the lectures delivered by some of the distinguished Italian geometers.

1. Mr. McNatt gave a method of calculating the volume of liquid contained in a right circular cylindrical tank, when the tank is inclined at any given angle.

2. Professor Saul Pollock exhibited a series of six models illustrating the special curves of intersection of two ruled cubic surfaces each having two pinch points. These curves of the ninth degree were composites and pointed out the results of matching pinch points, rulings, common conics, etc. In addition, a device was demonstrated by means of which it is possible to study space curves of any degree. The principle consisted of intersecting a surface with another surface consisting of light. The resulting curve of intersection is at once visible, and by moving one of the surfaces it is possible to study the variation in the curve.

3. (a) Mr. Hazard described a method of solving the quadratic equation in one unknown by means of a table of quarter-squares. Such tables have been computed for the purpose of finding the product of numbers by means of the relation: the quarter-square of the sum of two numbers minus the quarter-square of their difference equals their product. In the quadratic we have the sum and the product of the roots given, hence we can use the above relation to solve for the difference. The roots are then found from their sum and difference. This method has marked advantages over solving the quadratic equation by logarithms when the coefficients are large.

3. (b) Mr. Hazard demonstrated a rotating model for use in class instruction, in which the signs and values of sines and cosines are shown with their continuous variations throughout the entire circle.

5. Mr. Hutchinson's note dealt with real infinite series in a variable, x, which may be converted into power series in y by a substitution, $y=f(x)$. The interval of convergence of the power series is projected orthogonally onto the curve $y=f(x)$, thence orthogonally onto the x-axis, giving the regions of convergence, and divergence, of the original series.

8. There is always an extraneous factor when a differential equation of the type $f(x, y, p)=0$ has a singular solution. This paper by Professor Light shows how that factor can be found before formally solving the differential equation.

10. In a long article, Grundbegriffe der Mengenlehre, Neue Abhandlungen der Fries' schen Schule, 1906, G. Hessenberg raised the question as to what would happen if it could be proved, for example, that it is impossible to decide whether the number 2^{μ}, where $\mu=\sqrt{2}$ is an algebraic or a transcendental number. In his opinion mathematics would in this case be confronted with a difficulty more serious than any which has so far been encountered. The writer has not had access to the paper for many years and does not recall that any qualifying statements were made concerning the nature of the system of axioms used or concerning the laws of formal logic. In the absence of any such restrictions, it is easy to show that the difficulty would be solved by the introduction of two algebras, in one of which it would be an axiom that 2^{μ} is algebraic, in the other of which 2^{μ} would be transcendental.

11. In this paper, the author discusses some properties of those quartic surfaces with a double line which have the property that the conics on the surface, in pairs, constitute degenerate quartic curves of the first kind.

13. The projective differential properties of many figures may be studied by means of canonical expansions. Professor Stouffer derived such a canonical expansion for the equation of the plane curve, starting from a general expansion for the equation. The method required the proper choice of the triangle of reference. In a similar manner a canonical expansion suitable for the study of curved surfaces was also derived.

14. An answer to the question "What can the average student get out of the study of Mathematics" was given by Professor Adams. The values to be derived from the study were considered from the point of view of the student's social, economic, and individual life. His social life was shown to have been helped in giving him the valuable mental habits of neatness, orderliness, accuracy, persistence, intellectual honesty, and attention. His economic life has been benefited by direct application of mathematical principles to his business or profession, by fundamental training for further study in the sciences, and by the development of his ability to think clearly, rapidly, and accurately. His indi-

vidual life has profited by basic training in appreciation of beauty and by a realization of the exactness and order of the Universe.

PHILIP FITCH, *Secretary*

THE FIFTH MEETING OF THE INDIANA SECTION

The fifth meeting of the Indiana Section of the Mathematical Association of America was held May 11, 12, 1928 at Butler University, Indianapolis, Indiana.

There were sixty-one present at the meeting including the following thirty-one members of the Association: R. J. Aley, W. C. Arnold, Gladys L. Banes, Stanley Bolks, G. E. Carscallen, P. T. Copp, H. T. Davis, S. C. Davisson, J. E. Dotterer, W. E. Edington, P. D. Edwards, E. D. Grant, H. E. H. Greenleaf, Laurence Hadley, Cora B. Hennel, F. H. Hodge, E. N. Johnson, Kathryn M. Kennedy, Florence Long, Juna M. Lutz, T. E. Mason, H. R. Mathias, R. E. Peterson, C. K. Robbins, D. A. Rothrock, J. R. K. Stauffer, C. E. Stout, K. P. Williams, H. E. Wolfe, W. A. Zehring, and H. A. Zinszer.

On Friday evening at 6:30 a banquet was held at the Claypool Hotel which was attended by members of the Association and their guests. President Aley of Butler University presided.

At eight o'clock a public lecture under the auspices of Butler University was given by President D. W. MOOREHOUSE of Drake University, Des Moines, Iowa, on the subject: "The Milky Way." President Moorehouse, by means of lantern slides, traced the ever interesting history of man's expanding knowledge of the universe. The speaker called special attention to the perplexing problem presented by the presence of black patches in the midst of brilliant star clouds and showed how the evidence points to the existence of great dark nebulous masses in the milky way.

At the session on Saturday morning on the Butler campus, presided over by Professor J. E. Dotterer, Manchester college, chairman, the following officers were elected: Professor H. E. H. GREENLEAF, De Pauw University, chairman; Professor H. A. ZINSZER, Hanover College, vice-chairman; Professor H. T. DAVIS, Indiana University, secretary-treasurer.

A chairman's address was made by Professor J. E. DOTTERER on the subject: "The Mathematician as a Salesman." Professor Dotterer pointed out the duty incumbent upon the teacher, in addition to his actual instruction, of showing the fundamental connection between mathematics and actual living. He urged the need of exhibiting mathematics not only as a tool used in solving and explaining the universe in which we live, but also as a discipline, a cultural subject and an art.

Professor R. H. COON of the Latin Department of Indiana University fur-