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The Annual Meeting of the Rocky Mountain Section

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type by several repetitions of the transformation

$$x = \frac{r^2}{y - b} + a,$$

which is geometrically equivalent to reflecting the roots of the original equation in a circle in such a way as to make the desired root go over into a large root while the sum of the remaining roots is made small.

7. Professor Dustheimer had 300 catalogues examined from every state in the U. S. and every province of Canada. 50% require 2 units of secondary mathematics for entrance. 50% require from 18 to 24 hours for a mathematics major. 50% require 6 hours or less of mathematics for graduation. 30% offer from 20 to 30 hours of mathematics. 80% have no connection between mathematics and physics. 46% offer from 2 to 6 hours of astronomy; 30% have some connection between mathematics and astronomy; 30% teach no astronomy.

Answers to the questionnaire from 55 colleges (33 Ohio colleges) show the following: Only 16% require students majoring in mathematics to take history of mathematics. Sixty-one per cent. give courses in the teaching of mathematics while very few give courses combining the history and teaching of mathematics. Many of these courses are lecture courses, but nearly all of them use a textbook. The courses average 2 hours per semester and are generally open to juniors and seniors.

8. These reports were informal and humorous rather than scientific, dealing mainly with personal experiences.

9. Professor Hancock had Professor Barnett report the result of identical tests given to college freshmen who had had some college mathematics in the University of Cincinnati, Ohio State University and Adelbert College. The results in the three institutions were in fair agreement but decidedly unsatisfactory although the tests were extremely easy. Professor Swartzel explained a plan in use at the University of Pittsburgh whereby they demote students until they find their true level of preparation. Few failures need be recorded by this device, which works beneficially. Professor Holl reported the method used this year in Ohio Wesleyan University in sectioning freshmen entering with only one year of algebra. The discussion extended itself to nearly all phases of present-day education.

Professor Barnett presented the matter of the Carus monographs in an effective talk.

G. N. ARMSTRONG, *Secretary-Treasurer.*

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## THE ANNUAL MEETING OF THE ROCKY MOUNTAIN SECTION.

The ninth annual meeting of the Rocky Mountain Section was held at the University of Wyoming, Laramie, on April 10 and 11. There were thirty-six present, including the following ten members of the Association: I. M. DeLong,

Philip Fitch, J. C. Fitterer, H. C. Gossard, Claribel Kendall, G. H. Light, S. L. Macdonald, Letitia Odell, O. H. Rechar and H. E. Russell.

The section voted to hold the next meeting at the Colorado Agricultural College. The following officers were elected: S. L. MACDONALD, chairman; W. V. LOVITT, vice-chairman; PHILIP FITCH, secretary; G. H. LIGHT, treasurer.

Three committees were appointed, one to draft resolutions on the death of Dr. Carl E. Stromquist, formerly head of the department of mathematics at the University of Wyoming and a member of this section; one to formulate plans for the use of standard tests in connection with the teaching of mathematics in the colleges; and one to consider the advisability of procuring a speaker from outside the section for the next meeting.

On Friday evening, the members of the section were guests at a dinner given by the home economics department of the University. President A. C. Crane delivered an address of welcome on this occasion and expressed his pleasure at having the section meeting held at his institution. Professor S. L. Macdonald responded in a fitting manner in behalf of the guests.

Later in the evening the women members of the section were entertained at a production given by the Coffey-Miller players.

The following nine papers were read:

(1) "An endowment for the publication of the results of mathematical research" by Professor I. M. DELONG.

(2) "Mathematics as an aid in agricultural experimentation" by Professor A. G. CLARK (by invitation).

(3) "The relation of standard tests to the teaching of collegiate mathematics" by Professor H. C. GOSSARD.

(4) "Baade's asteroid" by Dean H. A. HOWE.

(5) "Points of view on the multiplicative axiom" by Professor C. H. RECHAR.

(6) "On the quinquenary cubic expressible as the sum of seven cubes" by Professor C. H. SISAM.

(7) "Integration in series" by Professor G. H. LIGHT.

(8) "Analysis of certain types of composite curves" by Mr. PHILIP FITCH.

(9) "On a tetrahedron" by Professor H. C. GOSSARD.

In the absence of the authors, the paper by Dean Howe was read by Professor Russell and the one by Professor Sisam by title only.

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

1. Professor DeLong pointed out the urgent need of funds for publishing results of mathematical research and made an appeal to all interested in mathematics to assist the American Mathematical Society in establishing an endowment large enough to insure the publication of the fine results that are being achieved by mathematicians in this country.

2. Professor Clark mentioned, in a brief way, various typical problems arising in agricultural experimental work where the need for mathematical treatment

was obvious. An actual problem, dealing with the peculiar results of the cross of two varieties of barley, was solved.

3. This paper was a report of experiments with speed, accuracy, and power tests in freshman and sophomore college mathematics. As a result of this report, the colleges and universities of the Rocky Mountain Section of the Association voted to coöperate in a continuation of this experiment.

4. The discovery of Baade's asteroid last October was made by photography. The computation of a preliminary orbit at the Student's Observatory of the University of California was beset with special difficulties, but when a reasonably correct orbit was finally obtained, a request from Denver brought an ephemeris of the planet, furnished in advance of publication, so that measures of its position with the 20-inch Denver telescope might begin at once. The orbit has been found to be the most eccentric planetary orbit known, with one exception. The inclination of the orbit is among the dozen highest. Only three planetoids come nearer to the earth than it does. Furthermore it is unusual in that it varies regularly in brightness in a period of a few hours. This is probably an indication of axial rotation, perhaps the first shown by any planetoid. Despite the faintness of this planet, a very large number of observations has been made at Denver, but the approaching opposition of the asteroid will cause a termination of the series.

5. Professor Rechar discussed the multiplicative axiom as brought to the fore by Zermelo's Theorem. The discussion centered around the points of view of various mathematicians, especially Baire, Borel, Hadamard, and Lebesgue. A summary of the principal problems and special fields affected by one's point of view on the axiom was included.

7. This paper gives methods for finding the solution of the differential equation

$$(x - a)^2 p_0 \frac{d^2 y}{dx^2} + (x - a) p_1 \frac{dy}{dx} + p_2 y = X.$$

It is shown when this equation will have a solution in ascending and descending powers of  $(x - a)$  as well as when a logarithmic solution occurs. The particular integral is found in a very simple manner.

8. Mr. Fitch discussed the analysis of composite curves obtained from experimental data arising from observations made on thermoluminescent and similar effects. He pointed out the necessity of being guided by the scientific facts involved while attempting such an analysis.

9. Following a suggestion by Dr. Morley of Johns Hopkins the author of this paper presented twenty-one relations between the edges and faces of a tetrahedron. The equation of the absolute is expressed first so that its coefficients are in terms of the edges of the tetrahedron and second in terms of its faces. The twenty-one resulting coefficients are then equated giving the desired relations.

PHILIP FITCH, *Secretary.*