Professor Doyle conducted a panel discussion on ways and means to encourage high schools to strengthen their mathematics programs. It was remarked that colleges should better coordinate what they expect of freshmen, and make better use of placement tests.

P. R. RIDER, *Secretary*

APRIL MEETING OF THE ROCKY MOUNTAIN SECTION

The thirty-first annual meeting of the Rocky Mountain Section of the Mathematical Association of America was held at Colorado A. and M. College, Fort Collins, Colorado, April 23 and 24, 1948. Professor H. T. Guard presided at all the sessions.

Among the eighty-one persons who registered were the following thirty members of the Association: C. F. Barr, D. L. Barrick, W. G. Brady, J. R. Britton, F. M. Carpenter, A. G. Clark, G. S. Cook, A. B. Farnell, F. N. Fisch, H. T. Guard, Leota C. Hayward, I. L. Hebel, Ruth I. Hoffman, LeRoy Holubar, Burrowes Hunt, J. A. Hurry, C. A. Hutchinson, A. J. Kempner, Claribel Kendall, A. J. Lewis, M. L. Madison, A. E. Mallory, W. K. Nelson, Greta Neubauer, K. L. Noble, Nathan Schwid, S. R. Smith, L. C. Snively, V. J. Varineau, Lillie C. Walters.

At the business meeting, the officers elected for the coming year were: Chairman, Professor I. L. Hebel, Colorado School of Mines; Vice-Chairman, Professor A. J. Lewis, University of Denver; Secretary-Treasurer, Professor J. R. Britton, University of Colorado. Professor A. J. Lewis was also elected Sectional Governor for a term of three years. A resolution commending Professor Abraham Wald for the excellence of his invited addresses was unanimously adopted.

The program of papers presented was as follows:

1. *A method of defining the real number system*, by Robert Howerton, University of Denver, introduced by A. J. Lewis.

2. *A slow-motion algorithm*, by Burrowes Hunt, University of Colorado.

The euclidean algorith for two relatively prime integers $a>b$ which leads to the equations

$$a = q_1 b + r_1, \qquad b = q_2 r_1 + r_2, \cdots$$

is modified by taking each $q_i = 1$. This algorithm terminates if and only if a and b are successive integers of the Fibronacci sequence. The least positive remainder is 1 if and only if, as a regular continued fraction, $a/b = (1; 1, \cdots, 1, k)$, k being an arbitrary positive integer. If $a/b = (1; 1, \cdots, 1_n, a_0, a_1, \cdots, a_k)$, and $(a_0; a_1, \cdots, a_k) = q/r$, the algorithm gives a least positive remainder r on the nth step.

3. *A note on expansion of determinants*, by Professor W. R. Eikelberger, University of Denver, introduced by A. J. Lewis.

4. *An approximation to the solution of a non-linear partial differential equation*, by Professor Nathan Schwid, University of Wyoming.

The differential equation of heat conduction

$$c\rho \frac{\partial u}{\partial t} = \frac{}{\partial x}\left(K \frac{\partial u}{\partial x}\right) + \frac{\partial}{\partial y}\left(K \frac{\partial u}{\partial y}\right) + \frac{\partial}{\partial z}\left(K \frac{\partial u}{\partial z}\right)$$

is non-linear when the conductivity K is a function of u. Here the diffusivity $K/c\rho$ is taken as $\alpha^2+\beta^2u$, where the ratio β^2/α^2 is small. The heat is considered as flowing in the x direction only in a plate of finite width. The solution of the resulting non-linear equation is approximated by a modification of a method given by Kirchoff about 1890 in the *Annalen der Physik* for an analogous problem involving flow of heat in one direction in a semi-infinite solid with the same type of diffusivity as above.

5. *Expansion of functions in combinations of generalized hypergeometric functions*, by Professor Leonard Bristow, University of Wyoming, introduced by C. F. Barr.

The purpose of this paper is to obtain the expansion of a suitable arbitrary function of a real variable in a series of solutions of a self adjoint differential equation of the Cauchy or Euler type containing a parameter. There are one-point boundary conditions (taken to be at $x=1$) together with regularizing conditions at the regular singular point (taken to be at $x=0$) of the differential equation. A Green's function is obtained. Fourier series, Fourier-Bessel, and Dini expansions in Bessel functions are obtained as special cases.

6. *Introduction to sequential analysis*, by Professor Abraham Wald, Columbia University.

7. *Principles of sequential analysis*, by Professor Abraham Wald, Columbia University.

These papers by Professor Wald were invited addresses.

8. *Ivory Towers*, by Miss Ruth I. Hoffman, Denver, Colorado.

There is need for college mathematics teachers to step down and become acquainted with the content of secondary mathematics, the problems and factors that influence the type of courses offered, and the quality of these courses. The university people should know of the valiant struggle that mathematics teachers in secondary education are making to keep up with modern educational trends, and to meet the needs of the present student body while still teaching sound mathematics, and even showing the beauty, as well as the usefulness, of mathematics.

9. *On certain equations involving radicals*, by Harlan Bartram, University of Colorado, introduced by A. J. Kempner.

The following problem was discussed: Given

$$\sqrt{a+bi}+\sqrt{c+di}=f, \qquad i=\sqrt{-1}.$$

If a, b, c, and d are real, and the signs of the radicals are properly chosen, when will f be real? The necessary and sufficient condition for this was found to be that $(b^2-d^2)^2=4(a-c)(ad^2-cb^2)$.

10 *Some teaching devices in undergraduate mathematics*, by Professor S. R. Smith, University of Wyoming.

Experience has shown that the majority of students entering college have difficulty in mathematics courses. At least part of this difficulty is due to lack of organization of their work, particularly in the solution of problems, and to the interpretation of the solutions found. Teaching devices, not necessarily new, are suggested to facilitate the solution of systems of quadratic equations, the discussion and sketching of plane curves in analytic geometry, and the application of the first and second derivatives in calculus.

11. *The book says so*, by Professor A. E. Mallory, Colorado State College of Education.

In this paper attention is called to the importance of teaching the connection between the solution of equations and the concept of a function.

12. *What constitutes good mathematics for undergraduates?* by Professor A. G. Clark, Colorado A. and M. College.

The author used the article, *Can We Teach Good Mathematics to Undergraduates?* by R. G. Helsel and T. Radó, which appeared in the January, 1948 issue of this MONTHLY, as the basis for his discussion. He agreed in part with the opinions of Helsel and Radó, but the extent of the agreement was dependent upon the connotation given the word "elegant," a term which mathematicians seem to have appropriated. The concept of "efficient" mathematics for undergraduates was presented.

13. *Report on entrance requirements,* by Professor A. J. Kempner, University of Colorado.

This paper was a brief report on the discussions which were held and the resolutions which were passed at the meetings of the Mathematical Association at Athens, Georgia, and the National Council of Teachers of Mathematics at Indianapolis, Indiana, in connection with the problems of lowering college entrance requirements and standards in general, and those pertaining to mathematics in particular.

Following a short discussion of the last paper, the following resolution was unanimously adopted: The Rocky Mountain Section of the Mathematical Association of America approves whole-heartedly the recent action of the Mathematical Association and the National Council of Teachers of Mathematics in expressing their desire for the closest cooperation in the critical problems confronting secondary and college mathematics.

J. R. BRITTON, *Secretary*

CALENDAR OF FUTURE MEETINGS

Joint Meeting with American Society for Engineering Education, Troy, New York, June 20–21, 1949.

Thirty-first Summer Meeting, Boulder, Colorado, August 29–30, 1949.

Thirty-third Annual Meeting, New York City, December 30, 1949.

ALLEGHENY MOUNTAIN West Virginia University, Morgantown, May 7, 1949
ILLINOIS, Bradley University, Peoria, May 13–14, 1949
INDIANA, University of Notre Dame, Spring, 1949
IOWA, Drake University, Des Moines, April 15–16, 1949
KANSAS, Manhattan, April 2, 1949
KENTUCKY
LOUISIANA-MISSISSIPPI, University of Mississippi, Oxford, Spring, 1949
MARYLAND-DISTRICT OF COLUMBIA-VIRGINIA
METROPOLITAN NEW YORK Brooklyn College, April 9, 1949
MICHIGAN
MINNESOTA
MISSOURI
NEBRASKA, Lincoln, May, 1949
NORTHERN CALIFORNIA
OHIO, Ohio State University, Columbus, April 2, 1949
OKLAHOMA
PACIFIC NORTHWEST, Oregon State College, Corvallis, March 25–26, 1949
PHILADELPHIA, Haverford College, November 26, 1949
ROCKY MOUNTAIN, Colorado School of Mines, Golden, April, 1949
SOUTHEASTERN, University of Alabama, University, March 18–19, 1949
SOUTHERN CALIFORNIA, John Muir Junior College, Pasadena, March 12, 1949
SOUTHWESTERN
TEXAS, Denton, Spring, 1949
UPPER NEW YORK STATE, University of Buffalo, April 30, 1949
WISCONSIN, Lawrence College, Appleton, May 14, 1949