



The April Meeting of the Metropolitan New York Section

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Mrs. Mary L. Yount, Winthrop College, has accepted a position as Research Technician with the Chemstrand Research Center, Research Triangle Institute, Durham, North Carolina.

Mr. K. M. Herstein, President, Herstein Laboratories, New York, New York, died June 1, 1961. He was a member of the Association for six years.

Professor Emeritus F. W. Owens, Pennsylvania State University, died June 22, 1961. He was a charter member of the Association.

Mrs. Georgia C. Smith, Spelman College, died May 6, 1961. She was a member of the Association for eight years.

Associate Professor D. E. Whitford, Polytechnic Institute of Brooklyn, died May 20, 1961. He was a member of the Association for forty years.

#### MATHEMATICS INSTRUCTORS NEEDED FOR 1962 N S F SUMMER INSTITUTES

Mathematicians available and interested in teaching in a 1962 N S F summer institute for high school mathematics teachers are invited by the Association's Committee on Institutes to send their names—along with brief statements of training, experience, and fields of special interest—to the Committee chairman, E. A. Cameron, University of North Carolina, Chapel Hill, North Carolina. Lists of the names and information submitted will be sent to directors of summer institutes.

With the increase in the number of institutes, the problem of adequate staffing is becoming more acute. Institute teaching offers a real opportunity for service to mathematics.

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## THE MATHEMATICAL ASSOCIATION OF AMERICA

### *Official Reports and Communications*

#### THE APRIL MEETING OF THE METROPOLITAN NEW YORK SECTION

The twentieth annual meeting of the Metropolitan New York Section of the Mathematical Association of America was held at Fordham University on April 15, 1961. The Academic Vice-President of Fordham, Rev. V. T. O'Keefe, S. J., welcomed the gathering. Professor J. P. Russell, Collegiate Vice-Chairman of the Section, presided at the morning session and Dr. George Grossman, High School Vice-Chairman, presided at the afternoon session. One hundred seventy-eight persons, including 97 members of the Association, attended the meeting.

Professor Azelle B. Walcher, Chairman of the Section, presided at the business meeting. Professor C. T. Salkind presented the awards to local winners in the mathematics contest sponsored by the Mathematical Association of America and the Society of Actuaries. He then gave reports as Chairman of the Contest Committee and as Governor of the Section. Reports were also presented by the Treasurer, Mr. Aaron Shapiro, and by Professor J. N. Eastham, Chairman of the Speakers' Bureau. The following officers were elected: Chairman, Professor J. P. Russell, Polytechnic Institute of Brooklyn; Vice-Chairmen, Professor Abraham Schwartz, City College, and Mr. Lester Schlumpf, Andrew Jackson High School; Secretary, Professor Mary P. Dolciani, Hunter College; Treasurer, Mr. Aaron Shapiro, Brooklyn College.

The following papers were presented at the meeting:

1. *A random process arising in air defence*, by Professor W. M. Hirsch, New York University. A file of attacking aircraft is considered as a queue which is moving toward an objective  $O$ .

A defending missile battery is regarded as a server who attempts to perform some operation on each element before that element reaches  $O$ . If an element in the queue reaches  $O$  without having been served, the server is subject to a risk of disability. The dependence of the process on various parameters (distance between queue elements, probability of disability of server, initial distance of first queue element from objective, etc.) is studied. Various problems concerning the probability distribution of the number of elements served are described. The role of simulation (and its relation to mathematical analysis) in studying such processes is discussed.

2. *Some second thoughts on artificial intelligences*, by Dr. Bradford Dunham, International Business Machines Corporation.

3. *The place of programmed instruction in mathematics education*, by Mr. Lewis Eigen, Vice-President, Center for Programed Instruction.

Dr. Bradford F. Hadnot of International Business Machines Corporation announced the formation of the Division of Mathematics of the New York Academy of Sciences and invited all members of the Association to participate in the activities of the Division.

MARY P. DOLCIANI, *Secretary*

#### THE APRIL MEETING OF THE ROCKY MOUNTAIN SECTION

The 44th annual meeting of the Rocky Mountain Section of the Mathematical Association of America was held at the University of Colorado, Boulder, on April 28–29, 1961. The following officers were elected: Chairman, Professor L. C. Barrett, South Dakota School of Mines and Technology; Vice-Chairman, Professor D. W. Robinson, Brigham Young University; Secretary-Treasurer, Professor Leota C. Hayward, Colorado State University.

The following papers were presented:

1. *Approximating the  $k$ th derivatives of a function by sums of Sturm-Liouville eigenfunctions*, by Professor F. M. Stein, Colorado State University.

The author uses eigenfunctions of a family of Sturm-Liouville systems as defined by Dunn and Stein, *SIAM Review*, January, 1961, to prove the existence of a sum,  $S_n(x)$ , of such eigenfunctions which uniformly approximates an arbitrary differentiable function,  $f(x)$ , and whose  $k$ th derivative at the same time uniformly approximates the corresponding derivative of  $f(x)$ . That is, it is proved that there exists a sum,  $S_n(x)$ , such that  $|f^{(k)}(x) - S_n^{(k)}(x)| < \epsilon$ ,  $k=0, 1, \dots, m$ , for  $\epsilon > 0$  and for all  $x$  on  $[a, b]$ , the closed interval over which  $f(x)$  and its derivatives are defined.

2. *Separation axioms between  $T_0$  and  $T_1$* , by Mr. C. E. Aull and Professor W. J. Thron, University of Colorado.

3. *A continuation of the zeta series and its implications*, by Professor W. E. Briggs, University of Colorado.

A standard method of continuing the zeta series  $\zeta(s) = \sum_{n=1}^{\infty} n^{-s}$  to the left of  $\text{Re } s = 1$  can be generalized for any integer  $a$  greater than 1 by writing  $(1 - a^{1-s})\zeta(s) = \sum_{n=1}^{\infty} \beta_n n^{-s}$ , where  $\beta_n = 1$  if  $a \nmid n$  and  $1 - a$  if  $a \mid n$ . To evaluate the right hand number and its derivatives at  $s=1$ , first write  $\sum_{n \leq x} (\log^k n)/n = (\log^{k+1} x)/(k+1) + \gamma_k + o(1)$ . It is now possible to derive the THEOREM. For integral  $a$  and  $k$ ,  $a \geq 2$ ,  $k \geq 0$ ,  $\sum_{n=1}^{\infty} (\beta_n \log^k n)/n = (\log^{k+1} a)/(k+1) - \sum_{t=0}^{k-1} \binom{k}{t} \gamma_t \log^{k-t} a$ , where the summation on the right is zero for  $k=0$ . By solving these equations for  $\gamma_t$ , one immediately obtains the principal result of a paper by Kluwyver (*Quar. J. Math.*, vol. 50, 1927, 185–192). In particular this gives  $\gamma = \frac{1}{2} \log a - \sum_{n=1}^{\infty} (\beta_n/n) \log_a n$ .

4. *Methods of proving mean value theorems*, by Professor L. C. Barrett, South Dakota School of Mines.

The primary purpose of this paper is to emphasize the equivalence of various proofs of the extended law of the mean, including analytic, geometric, vector, and determinant types of proof. A yet more general method of generating mean value theorems is also given.