THE NOVEMBER MEETING IN MILWAUKEE

The 520th meeting of the American Mathematical Society was held at the Milwaukee Branch of the University of Wisconsin on Friday, November 25, and at Marquette University on Saturday, November 26. There were 130 registrations of which 107 were members of the Society. The sessions began at 9:00 A.M. Friday and ended at noon on Saturday.

The Committee to Select Hour Speakers for Western Sectional Meetings had invited Professor E. H. Spanier of the University of Chicago to address the Society. Professor S. S. Chern presided at the lecture, *Aspects of duality in homotopy theory*, which was presented on Friday morning at 11:00 A.M.

Presiding officers at the sessions for contributive papers were Professors W. T. Reid, Morris Marden, and H. P. Pettit.

There was a tea for members of the Society and their guests on Friday afternoon at the Milwaukee Branch of the University of Wisconsin, and on Saturday Marquette University played host at a luncheon celebrating the 75th anniversary of their founding. On Friday evening the Society were guests of the Miller Brewing Company for a tour of the brewery followed by a buffet supper and beer at the Miller High Life Inn. The occasion was probably unique in the long and distinguished annals of the Society.

Abstracts of papers presented at the meeting follow. Those with "*t*" after the abstract number were presented by title. In the case of joint papers, the name of the author who read the paper is followed by (p). Mr. Ornstein was introduced by Professor Irving Kaplansky and Professor L. V. Toralballa by Professor J. W. T. Youngs.

ALGEBRA AND THEORY OF NUMBERS

123*t*. K. T. Chen: *Integration of paths—geometric invariants and a generalized Baker-Hausdorff formula.*

Let the path α in the affine m-space R^m be given by $x_i=\alpha_i(t)$, $i=1, \cdots, m$, $a \leqq t \leqq b$. Starting from the line integral $\int_\alpha d(i)=\int_\alpha dx_i$, one defines inductively, for $p \geqq 2$, $\int_\alpha d(i_1, \cdots, i_p)=\int_a^b[\int_{\alpha^t} d(i_1, \cdots, i_{p-1})]d\alpha_{i_p}(t)$ where α^t denotes the portion of α with the parameter ranging from a to t. The integral remains unchanged when α undergoes a translation. It is further observed that the totality of $\int_\alpha d(i_1, \cdots, i_p)$, with p fixed, forms a pth order tensor associated with α under linear transformations of R^m. If all $\int_\alpha d(i_1, \cdots, i_p)=0$ for $p \leqq r$, then α is said to be of lower central class r, which is an affine invariant of α. The paths of lower central class 1 are characterized by being closed; and those of lower central class 2, by enclosing zero algebraic area when projected on any plane in R^m. Let $X_1, \cdots, X_m$ be noncommutative indeterminates. Define $\theta(\alpha)=1+\sum\int_\alpha d(i)X_i+\sum\int_\alpha d(i, j)X_iX_j+\sum\int_\alpha d(i, j, k)X_iX_jX_k$