

## ABSTRACTS OF PAPERS

## SUBMITTED FOR PRESENTATION TO THE SOCIETY

The following papers have been submitted to the Secretary and the Associate Secretaries of the Society for presentation at meetings of the Society. They are numbered serially throughout this volume. Cross-references to them in the reports of the meetings will give the number of this volume, the number of this issue, and the serial number of the abstract.

264. Professor C. G. Latimer: *On the fundamental number of a rational generalized quaternion algebra.*

Let  $\mathfrak{A}$  be a rational generalized quaternion algebra with a basis  $1, i, j, ij$ , where  $i^2 = -\alpha, j^2 = -\beta, ij = -ji$ ;  $\alpha$  and  $\beta$  being integers, neither divisible by the square of a prime. Brandt defined the fundamental number  $d$  of  $\mathfrak{A}$  and showed that two algebras with the same  $d$  were equivalent. (*Idealtheorie in Quaternionenalgebren*, Mathematische Annalen, vol. 99 (1928), pp. 9–12.) In this paper,  $d$  is determined explicitly in terms of certain divisors of  $\alpha$  and  $\beta$ . In a recent paper, Albert showed that  $\mathfrak{A}$  has a basis in the above form with  $\alpha = -\tau, \beta = -\sigma$  where  $\tau, \sigma$  satisfy certain conditions. (*Integral domains in rational generalized quaternion algebras*, this Bulletin, vol. 40 (1934), pp. 167–168.) As an application of the present theorem, it is found that Albert's  $\sigma = -d$  and that his  $\tau$  may be any integer satisfying the conditions mentioned above. (Received May 15, 1935.)

265. Professor E. T. Bell: *General relations between Bernoulli, Euler, and allied polynomials.*

The relations in question form a complete set, connecting any  $n$  ( $n = 1, 2, 3, 4$ ) of the polynomials, which appear in the relations as the arguments of arbitrary functions, the arguments being linear in the polynomials (precisely, in the umbrae of the polynomials). There are also general relations connecting polynomials whose ranks are in arithmetical progression. By setting the variable equal to zero or one in the relations, corresponding relations are obtained for the associated numbers. (Received May 18, 1935.)

266. Mr. Garrett Birkhoff: *Abstract continuous groups. I: Linear spaces.*

It is shown that functions between any linear spaces occurring in practice can be analyzed by the methods of the calculus. The most interesting new developments are, the description of these spaces by direct *combination* of norm functions, a related definition of the "order" of a function, a characterization of polynomials by functional equations. (Received May 18, 1935.)