Logic and Foundations

333. A. R. Schweitzer: *On a class of ordered $(n+1)$-ads relevant to the algebra of logic.* III.

The author analyzes the formal sum (now not necessarily reflexive) of $(n+1)$-ads of generalized constituent type into two types of ordered dyads: $\xi\cdot\eta$, multiplicative, and $(\xi)+(\eta)$, additive, where $(\xi)=\xi_1\xi_2 \cdots \xi_{n+1}$. Addition is assumed commutative and associative; multiplication is associative but not necessarily commutative. Formal addition is extended to elements ξ by assuming the formal equivalence: $(\alpha_1+\lambda_1)(\alpha_2+\lambda_2)\cdots(\alpha_{n+1}+\lambda_{n+1})=\alpha_1\alpha_2\cdots\alpha_{n+1}+\lambda_1\alpha_2\cdots\alpha_{n+1}+\cdots\lambda_1\lambda_2\cdots\lambda_{n+1}$. This assumption effects a gradual transition from the author's theory to formal developments based on the distributive property such as Grassmann's extensive algebra, the algebra of logic, Frobenius' calculus of group elements, number systems (fields) and so on. Grassmann's algebra contrasts with the latter in reference to closure properties. These are defined in terms of completeness (extension, invariance, attainment of limit of development) of the fundamental set of elements with reference to adjunction of operations on elements ξ, for example, $\xi\cdot\eta$, $\xi+\eta$. Finally the author discusses applications of restricted distributive properties such as $(x+y)y=xy+y^2$, $(x+I)y=xy+Iy$, where $Iy=y$ and addition and multiplication may or may not be reflexive. Reference is made to a paper reported in this Bulletin, abstract 48-3-135. (Received August 15, 1942.)

334. Saly R. R. Struik: *Axiomatics of affine geometry.*

The axiomatics are developed for two and three dimensions separately. The theorem of Desargues is used as an axiom in two dimensions. (Received August 6, 1942.)

Statistics and Probability

335. T. N. E. Greville: *Regularity of label-sequences under configuration transformations.*

There is developed a class of transformations on sequences of arbitrary labels in terms of which a wide variety of problems in the theory of probability can be formulated. It is shown that, with mild restrictions on the transformations used and on the measure function assumed on the label-space, almost every label-sequence produces a transform having the frequency distribution expected. The class of transformations considered is shown to include as special cases the four fundamental operations ot von Mises: place selection, partition, mixing, and combination. (Received August 4, 1942.)

336. H. B. Mann: *The construction of orthogonal Latin squares.*

A Latin square is based on a group G if in the reduced form its rows form a regular representation of G. A set of orthogonal squares is based on G if all the squares of the set are based on the same representation of G. The mappings $S_1, S_2, \cdots, S_r$ of G onto itself are r-fold complete if every element of G is of the form $X^{S_i+S_{i+1}+\cdots+S_{i+h}}$ for every i and h with $1\leqq i\leqq r-h$ where X^{S_i} is the image of X under the mapping S_i and $X^{S_i+S_j}=X^{S_i}X^{S_j}$. A set of r orthogonal squares based on G exists if and only if G admits an r-fold complete mapping and vice versa. No $4n+2$ sided Graeco-Latin square based on a group exists. The orthogonal set is constructed by the automorphism method if for every i the mapping $S_1+S_2+\cdots+S_i$ is an automorphism of G. If