relativity which is supported by large numbers of accurate experiments. Even within the theoretical framework of general relativity it can surely not be regarded as unimportant; for example, the principle of equivalence, when combined with symmetry properties and the fact that Newtonian gravitational theory must be a valid approximation, leads directly to the conclusion that the space-time of a massive spherical body at rest must be curved. The other important omission is the subject of variational principles for the gravitational field and other fields which interact with it, and the beautiful and deep relationship discovered by Hilbert and Klein between the invariance properties of the action integral and the existence of differential conservation laws. This theory of the structure of field theories is required if one attempts to understand the energy momentum tensor not as a mere phenomenological description of matter, but as a sum of contributions from other fields (electromagnetic field, electron field, etc.) which are the joint sources of the gravitational field. It is also required if one attempts to construct other gravitational theories of the type of general relativity, which share with it some desirable characteristics, covariance and the existence of conservation laws.

Synge's books belong on the shelf of every serious student of relativity—but they should be flanked by other books on the subject. John Power and John Jameson can be proud to have *Relativity: The general theory* dedicated to them.

ALFRED SCHILD

Mathematical foundations of quantum statistics. By A. Y. Khinchin (Translation from 1951 Russian Edition edited by Irwin Shapiro). Graylock Press, New York, 1960. 11+232 pp. $10.00.

Let $\mathcal{H}$ be the Hilbert space whose unit vectors define the pure states for a quantum mechanical particle. Let H be the energy operator and suppose that this operator has a pure point spectrum with eigenvalues $0 \leqq \epsilon_1 \leqq \epsilon_2 \leqq \cdots$. For each positive integer N, let $\mathcal{H}_N$ denote the N fold tensor product of $\mathcal{H}$ with itself and let H_N denote the sum

$$H \times I \times \cdots \times I + I \times H \times I \cdots \times I + \cdots + I \times I \times I \cdots H$$

where I is the identity and each product has N factors. Then $\mathcal{H}_N$ and H_N are the Hilbert space and energy operator for a system of N noninteracting replicas of the particle described by $\mathcal{H}$ and H. Let $\mathcal{H}_N^S$ denote the closed subspace of $\mathcal{H}_N$ consisting of all symmetric members of the tensor product and let $\mathcal{H}_N^A$ denote the closed subspace of $\mathcal{H}_N$ consisting of all anti-symmetric members of the tensor product.