method to as few as two hundred and forty individuals, (the number in a study reported by the author). For this reason the generality which he claims by not assuming normality is, for the most part, illusory. Of prime importance among the mathematical problems are those which arise in dealing with sampling variations. These would include the problem of determining optimum estimates of the elements in F, and in actually developing an objective criterion and its probability theory for testing the hypothesis that a set of correlation coefficients can be explained by an F which has been found by any method whatever. Further development of the multiple factor theory will depend largely upon solutions of these problems.

S. S. WILKS

Leçons d'Analyse Vectorielle. By Gustave Juvet. Part II. Paris, Gauthier-Villars, 1935. 306 pp.

This second part of Juvet's *Vector Analysis* contains the applications to mathematical physics. These relate mainly to potential theory, fluid dynamics, and electromagnetic theory. The book contains a good collection of exercises. To provide a basis for the fundamental existence theorems, a brief treatment of Fredholm's theory of linear integral equations is given and an appendix is included which contains the elements of the theory of functions of a complex variable. The mathematical discussions are of intermediate character, making use of conditions of continuity and convergence, but not stressing these matters as much as is customary in works on pure mathematics.

H. B. PHILLIPS

Science and the Human Temperament. By Erwin Schrödinger. New York, W. W. Norton, 1935. 24+192 pp.

Schrödinger writes: "The old links between philosophy and physical science . . . are being more closely renewed. The farther physical science progresses the less can it dispense with philosophical criticism." This book may be regarded as a substantiation of this thesis by means of an illuminating analysis of certain fundamental ideas and issues in contemporary physics.

The most important chapter is entitled *The Fundamental Idea of Wave Mechanics.* It presents the author's theory as a natural development of, and the first theoretical justification for, the similarity between Fermat's principle of minimum time in optics and Hamilton's minimum principle in mechanics. This and the entire previous chapter discuss the role of models in physics.

Two other philosophical issues receive extensive consideration. They are scientific law and causality. The universal reduction of statistical to causal laws is regarded as unjustified. Even the rigorous application of causality in Newtonian mechanics is queried. It required that velocity be determined in defining a state. But velocity was identified with a differential quotient which was defined as $(x_2-x_1)/(t_2-t_1)$ as $t_2-t_1 \rightarrow 0$. Hence, the velocity referred "to two units of time and not the state at one moment." Against the coincidence of the two units in the limit, he adds that "possibly this mathematical process of approach to the limit . . . is inadmissible" and "is inadequately adapted to nature" (pp. 61–62).