

## SHORTER NOTICES

*Abriss der Logistik.* By Rudolf Carnap. Wien, J. Springer, 1929. iv+114 pp.

The first part of this "outline" will be of interest primarily to those who desire a brief introduction to modern symbolic logic and the foundations of mathematics. Dr. Carnap, following, for the most part, the usages, development and analyses of the *Principia Mathematica*, expresses in the Peanesque notation the more important concepts and propositions of propositional logic, the logic of classes, the logic of relations, cardinal arithmetic, series, progressions, continua, etc. New and difficult concepts are frequently illuminated by simple illustrations. A considerable number of new symbols are introduced, and a definite formulation of the principle of substitution, (inexplicably omitted from the *Principia Mathematica*), is provided.

In the second, more important and original part, in terms of a few primitive ideas for each discipline, some of the fundamental concepts and propositions of such diverse studies as the theory of aggregates, geometrical topics, projective geometry, modern physics, causality, epistemology, etc., are represented. This section (together with the appendix, where a number of suggestions are offered for alternative approaches to the same subjects) marks a considerable extension of logistic; though, as the novel applications are not thoroughly exploited, and only obvious deductions and analyses are provided, there is no surety that the chosen primitives are always adequate for the given disciplines.

Logistic developments are never final. They are merely intermediate steps in the derivation of special sciences from logic. As all ideas are expressible in terms of class concepts, relations and associated notions, the "axioms" (Carnap's term) of all exact, logisticized sciences should be expressible as propositions which are completely derivable from the concepts and propositions of logic. Such a procedure will immediately reveal the strength and weakness of the familiar thesis (which Dr. Carnap accepts), that mathematics is a branch of logic. How much caste that thesis will retain when it is realized that, in the same sense in which mathematics is a part of logic, physics, epistemology, biology, grammar, etc. are also parts of it, is a matter for speculation. That realization, however, will bring home the as yet unrecognized necessity for a rediscussion of the nature of necessary truths, inasmuch as there does seem to be a sense in which the propositions of logic are necessary apart from all systems, in contrast to those of mathematics and other essentially systemic sciences.

The first part of this work is an excellent pocket *Principia Mathematica*; the second part should prove of value to those who are interested in extensions of logistic; as a whole it should help provide answers to questions regarding the significance of the logistic and logico-mathematical movement.

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