

Formalization of Logic

By Prof. Rudolf Carnap. (Studies in Semantics, Vol. 2.) Pp. xviii+159. (Cambridge, Mass.: Harvard University Press; London: Oxford University Press, 1943.) 16s. 6d. net.

THE starting-point of Prof. Carnap's work is the distinction between two aspects or tendencies in logic. On one hand, there is the tendency to emphasize form, the logical structure of sentences and deductions, relations between signs in abstraction from their meaning: this is Hilbert and Bernays' *Beweistheorie*, Carnap's *syntax*. In contradistinction to it is the emphasis on meaning, interpretation, relations of entailment and compatibility as based on meaning, the distinction between necessary and contingent truth, etc.: this is *semantics*, and corresponds generally to Hilbert and Bernays' *mengentheoretische Logik*. Prof. Carnap is planning a series of studies on semantics, of which the volume under review is the second (the first being an "Introduction to Semantics"); it deals with the application of his methods to a criticism of the formalization of logic, that is, its representation by a formal system or calculus. The problem is to determine to what extent the logical calculi that have been constructed hitherto have actually effected the task of formalizing logic in such a way that the principal logical signs can be interpreted only in terms of the accepted logic of meaning; a question which the author answers in the negative. He shows, however, that a full formalization of propositional logic, and also of the logic of functions, can be effected by making use of new basic concepts, the most important step being the introduction of *junctions*, that is, of sentential classes in conjunctive and in disjunctive conception.

The book is an important contribution to the development of its subject.

Mathematical Statistics

By S. S. Wilks. Pp. xi+284. (Princeton, N.J.: Princeton University Press; London: Oxford University Press, 1943.) 25s. net.

IN the preface Dr. Wilks makes the remark, "If and when the present notes are revised and issued in a permanent form", which suggests that the author does not need reminding of the disadvantages of giving his work to the world in a paper-covered volume of litho-printed typescript. The reviewer has certainly found this format uncomfortable.

As to substance, it is clear that Dr. Wilks has industriously gathered much material from the periodical literature, rewritten it in a consistent, if austere, mathematical notation, and thrown overboard as superfluous almost all discussion of relevance and applicability. Whatever value the course of lectures on which it is based may have to the mathematical students who take them, it seems to give no insight into *why* any particular problem should be propounded, or as to the function of mathematical reasoning in improving statistical methods. Time after time a perfectly competent, though perhaps arid, section closes with a note of finality, without a hint of the wider horizons which might have been disclosed.

The book as it stands may well be useful to some, who occasionally need to refer to a careful and precise statement on some special point. They will not find it elaborated, or exemplified; and may well be disappointed, on the purely mathematical side, by the

author's pedestrian style, for the development of mathematical statistics has not really been poor in those flashes of originality and penetration which mathematicians sometimes call 'artifices'. Dr. Wilks should not disdain to reproduce such work, for, like all good artistry, it gives much pleasure, without detriment to practical aims.

R. A. F.

Oddities of Natural History

By Eric Parker. Pp. 228+8 plates. (London: Seeley, Service and Co., Ltd., 1943.) 12s. 6d. net.

READERS of the *Field* will be familiar with the kind of letters that find their way into the correspondence column of that journal. This column serves as a sorting-house for the unusual incidents and observations which are little known in the animal kingdom and for which we are deeply indebted to so many 'amateur' naturalists. In order that the more significant of these observations should be available in readily accessible form, Mr. Eric Parker has made an exhaustive examination into past issues of the *Field* over many years, and his collected findings are set out in this book. It will be of most value to those actual or would-be correspondents to the *Field* whose propensities enable them to interpret the behaviour of animals in terms of human sentiment and emotions. They will read the book with avidity. Naturalists who find the anthropomorphic and teleological assumptions a deflexion from rational objectivity will find much to irritate them. Parker's approach is in direct contrast to that of the writer whose recent book on the life of the robin showed how it is possible to maintain the strictest regard for exact observation and interpretation without in any way concealing one's love for the subject being studied.

T. H. H.

A Star Atlas and Reference Handbook (Epoch 1950)

For Students and Amateurs. By Arthur P. Norton; the Reference Handbook by J. Gall Inglis and A. P. Norton. Ninth Edition. Pp. xvi+90. (London and Edinburgh: Gall and Inglis, 1943.) 15s. net.

THE first edition of this work appeared in 1910, and this latest edition—the ninth—contains a number of alterations to bring it more up to date. Stars from the Revised Harvard Photometry down to magnitude 6.35 have been charted, and all nebulae, except those of Messier and those classed by Herschel, have received the N.G.C. numbers. Small circles are used to indicate all variable stars which attain the sixth or seventh magnitude at their maximum brightness. The recommendation of the International Astronomical Union regarding the galactic equator and poles has been adopted, so that these differ a little from those shown in the maps of the earlier editions. In the earlier maps, limited abbreviation lists were printed in the margins, and these have been replaced by a complete list occupying a page, preceding the charts.

In addition to the value of the work as a star atlas, it contains most useful and authoritative information on star nomenclature; astronomical terms; the galaxy and the stars; spectroscopy; the sun, moon, and planets; the care and use of the telescope. It is remarkable that so much reliable detail has been condensed into a little more than fifty pages, and the provision of an index at the beginning of the book enables one to turn immediately to the page which supplies the necessary information. An astronomer's library is incomplete without a copy of this valuable work.