symptoms and tendencies could be discovered by means of association experiments which could not have been found by any other method, and they testify especially to the value of the introspections of the subjects. These seem to be somewhat meagre, as one would expect, when compared with the introspections of normal persons, though some authorities claim that the introspections of the mentally afflicted are not necessarily any less *reliable* than those of healthy individuals.

The authors emphasise the fact that the lengthening of the association reaction time may be due to causes other than the existence of a "complex," *e.g.* to the rare employment of the stimulus word, to its abstract nature (adverbs, numbers, etc.) or to a mental state which one meets especially in some psychasthenic patients consisting of an exaggerated desire to give intelligent answers.

Complete forgetfulness of the reaction word was sometimes discovered immediately after the reaction, especially where the existence of a "complex" was suspected.

A brief summary of inferences follows the records of experiments on each patient, but there is little in the way of broad discussion of psychological theory. A bibliography is appended of one hundred and sixty-four articles and books bearing on the subject.

C. W. VALENTINE.

Les Maladies Sociales. By PAUL GAULTIER. Paris. Librairie Hachette et Cie, 1913. Pp. vi, 270.

This small volume deals with adolescent criminality, alcoholism, depopulation, pornography, and suicide. The titles of these divisions of the volume are sufficient to indicate the substance. The author is profoundly impressed with the national danger of de-population, but finds ground of hope in the fact that the restriction of population is not biological, but voluntary. His remedies are on somewhat commonplace lines ; but possibly, all real "remedies," if there be such for the given phenomena, must be commonplace. The book is excellently written and the references are more than sufficient to make it a genuine introduction to the study of all the problems named. In the discussion of "the plague of de-population," the standpoint is the contrary of that taken by Prof. Michels in *Sexual Ethics.*

W. L. M.

Über mathematisches Denken und den Begriff der aktuellen Form. Dr. LEONID GABRILOVITSCH. Berlin: Leonhard Simion. Pp. 92.

This little book deals with the relations of Logic and Mathematics. It has the rare merits, for a German philosophical work, of conciseness and clearness. Taking such work as Hilbert's on the foundations of geometry and Russell's and Whitehead's *Principia Mathematica* as texts, Dr. Gabrilovitsch seeks to determine precisely what is merely defined by postulates and what must actually be known in itself. Thus in Hilbert's work we have no need to have any notion of points or lines or planes except as things that are connected with each other in certain definite ways; and again the particular system of axioms which Hilbert lays down is not necessary. But of course all the reasoning about these things is conducted logically ; and the question arises. How much in symbolic logic itself can be treated as merely defined by arbitrary (though consistent) axioms, and how much must be assumed to be actually known in itself? It is of course clear that both certain entities and certain laws of connexion will have to be known, and not merely arbitrarily defined, if symbolic logic itself (and therefore all the sciences that use it) is not to be wholly arbitrary.

In the present work Dr. Gabrilovitsch is concerned rather with entities than with laws. He enumerates several which must be known and not merely defined by postulates if logic is to proceed at all, and then he devotes himself to showing how such knowledge is possible. Thus he holds that before we can begin a symbolic calculus at all we must know what is meant by Identity, Difference, and Order. Unless we do this we shall not, for instance, understand what is meant by the same symbol standing throughout our reasonings for the same entity, or different symbols for different ones. And again we shall not, unless we already have a notion of order, understand the difference between $p)q$ and $q)p$, or see how, when these are significant, pq) is nonsense.

He argues that the whole object of mathematical development is to replace qualitative concepts by relations, and that mathematical form is an order of contents, and not their existence or qualities. This is an important step in his argument and it seems to me weak. He takes qualities like circular, as abstracted from sensuous experience, and, comparing them with the mathematical definition of a circle by its equation, remarks that qualitative circularity is always vague because a matter of degree, whilst the mathematical definition is precise because it replaces qualities by relations which have no degree. And he concludes from this that the fundamental notions of mathematics cannot be reached by abstraction from instances of them in experience. To this one may answer (1) that some relations have degrees, (2) that it is not obvious that all qualities must be terms in continuous series as colours and sounds are, and (3) that, because some things that are abstracted from sensible experience are qualities, and some qualities are terms of continuous series, it does not follow that relations may not also be abstracted from sensible experience and that some of these may not be perfect by determinate. For instance, difference is a relation, and it certainly holds between terms in sensible experience—wherever else it may hold also; and it is not in the least vague, for the fact that I may judge two things to be exactly alike when really they are different does not mean that I am vague about the meaning of difference. Dr. Gabrilovitsch adds the argument that, if difference were a content like any other, I should have to experience not only a and b and their difference, but also the difference between a and its difference from b, and so on to infinity. But, in the first place, difference no doubt is not a content, *just like* different sensible things, yet the experience of different sensible things may be enough to direct our attention to it. And, when this is admitted, there seems no more need for me to go on to recognise all the infinite set of different differences that are connected with a and b than to recognise anything else in which I am not immediately interested. Moreover it is at least doubtful whether differences do differ; and, if they do not, there is no chance of an infinite regress. There is a and b and difference; and all the possible judgments are 'a differs from b,' 'a differs from difference' and 'b differs from difference'; whilst the difference of a from b is identical with the differences of a and of b from difference.

However, Dr Gabrilovitsch considers himself forced to account for the origin of our knowledge of difference otherwise than by reflexion on the differences in our experience. He introduces the notion here of Actual Form. The point is that we have a mass of sensible experience which we can go through discursively by a mental act. But at no moment can our discursive act bring the whole of it before us; we are always conscious of the presence of an X to which this act has not as yet applied itself. Now we learn about identity and difference in the distinction between that part to which the act has applied and the remaining X. The former is determinate. *logically* one, and self-identical; and it is different from the remaining X. Also we thus learn of identity and difference as

universal because the limits of the determinate and the X are always shifting, and we see that such and such a proportion between them is irrelevant to the self-identity of the one and its difference from the other. I am quite prepared to accept much that Dr. Gabrilovitsch says here; but I only see in it a special example which may lead us to recognise identity and difference. I do not see that they must be recognised in this way, nor why an act of inspection directed to two determinate objects in the not-X should not equally well make us aware of difference. Nor does Dr. Gabrilovitsch's theory seem to account as well as he thinks for our knowledge of the universality of identity and difference. How will the fact that the X and the not-X are certainly shifting their boundaries show that difference ever holds between two determinate parts of the not-X, and not merely between X and not-X as wholes?

Dr. Gabrilovitsch has some good criticisms on the Marburg school. He points out that, unless the sensuous manifold has some definite constitution of its own, it is inexplicable how relations which are purely the products of thought can apply to some parts of it and not to others. He then goes on to argue that logic really presupposes a knowledge of the meaning of number as well as of identity and difference. You must know what you mean, e.g., by treating a complicated expression in brackets as a unity. But he admits a difference between this logical unity and the 1 of arithmetic. On his view the number series arises by applying the actual form to itself. First we have not-X opposed to X, i.e., one (in the logical sense) opposed to another. But then we can consider this application with its two sides as a content and oppose to it another X. This content will be a not-X and a logical unity. But it is now recognised as being a unity with two terms, and it itself is the number 2, while the parts are arithmetical 1's. He compares this with Jevons's theory of numbers, which make 2 a difference, and 3 a difference of two differences, and so on. It seems to me that both theories err by giving as the *number itself* something that *has* the number.

By this procedure Dr. Gabrilovitsch produces the number series, and is able to see that it has no last term. And, by accepting Helmholtz's theory that arithmetical operations are applications of counting to the number series itself, whilst rejecting the view that the series itself is merely arbitrary, he professes to prove the principle of Mathematical Induction. The book is an interesting one and contains many acute criticisms; but I doubt if it makes out its point.

<div align="right">C. D. BROAD.</div>

Untersuchungen zur Logik der Gegenwart. Von Prof. Dr. WILHELM KOPPELMANN, Privatdozent a.d Westphäl. Wilhelmsuniversität. I. Teil. Lehre vom Denken u. Erkennen. Berlin : Verlag von Reuter u. Reichard, 1913. Pp. v, 278. M. 6 50.

The present volume is a first part, dealing with the principles of thought and cognition, to be followed by a second part treating of formal logic.

Erkenntniss-lehre is described as asking the question : "To what conditions is cognition subject, and what are its limits?" Formal Logic is the theory of the conditions which govern the linguistic interchange of thought. The two together constitute Logic as the science of correct thinking. To think is to set in order (*ordnen*).

Here we have almost wholly a study in Erkenntniss-theorie; and it has interest as an extremely characteristic example of this attitude. The author intentionally attaches himself to the movement which began with Locke, and culminated in Kant. Only the last of his eight chapters discusses the logic of inference, refuting Mill's account of the ground of Induction at a length now surely quite unnecessary, and distinguishing