ad absurdum, since it is well known to mathematicians that any finite interval contains an infinite number of finite intervals; so that supposing there is no finite limit to the shortness of time required for an intellectual process, an infinite number of them, each occupying a finite time, may be crowded into any time, however short.

The Professor concludes:

"So far, then, from perception being a species of reasoning, properly so called, both it and reasoning are coördinate varieties of that deeper sort of process known psychologically as the association of ideas, and—"

We break the sentence, which goes on to something else, in order to remark that "a species of reasoning properly so called" must be a slip of the pen. For otherwise there would be an *ignoratio elenchi*; nobody ever having claimed that perception is inference in the strict sense of conscious inference. Instead of "a species of reasoning properly so called," we must read "reasoning in a generalized sense." Remembering also that Prof. James began by insisting on extending the controversy to association in general, we may put association in place of perception, and thus the conclusion will be, "so far from association being reasoning in a generalized sense, reasoning is a special kind of association." Who does not see that to say that perception and reasoning are coördinate varieties of association, is to say something in entire harmony with the thesis which Prof. James is endeavoring to combat? To resume:

"—physiologically as the law of habit in the brain. To call perception unconscious reasoning is thus either a useless metaphor or a positively misleading confusion between two different things."

Here the section ends, and in these last words, for the first time in the whole discussion, the real question at issue is at length touched, and it is dismissed with an *ipse dixit.* There is no room for doubt that perception and, more generally, associative suggestion, may truthfully be considered as inference in a generalized sense; the only question is whether there is any use in so considering them. Had Prof. James succeeded in establishing his *regressus ad infinitum,* he would have refuted himself effectually, since it would then have been shown that an important consequence, not otherwise known, had been drawn from the theory. As it is, he says nothing pertinent either pro or con. But a little before, when an unconscious predication was called perception, was this perception "properly so called"? And if not, was calling it by that name a "useless metaphor," or was it a "positively misleading confusion between two different things"?

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Vorlesungen über die Algebra der Logik.
Von Dr. Ernst Schröder. Leipzig: Teubner. 1890. Vol. 1, Pp. 717.

This review of Schröder's first volume is unassigned in Haskell's *Index to* The Nation, vol. 1. This leaves open the possibility that it is a review by Peirce, based on certain internal signs such as the reference to Peirce's work and that of O. H. Mitchell.

Ernst Schröder (1841-1902) was a German mathematician and logician. As a young man, Schröder studied physics and chemistry with such famous men as Bunsen, Kirchhoff, and Hesse. From 1870 until 1874, he held the post of professor of mathematics and natural sciences at the Pro- und Realgymnasium at Baden-Baden. For the two years following 1874, he taught mathematics at the Technische Hochschule at Darmstadt, from which he moved in 1876 to the Technische Hochschule at Karlsruhe, his final academic post.

The Algebra of Logic has here received an admirable setting forth at the hands of Dr. Schröder. The book is doubtless too large and too diffuse, but it is chiefly intended for a German audience (the subject has been hitherto neglected in that country), and Germans are not frightened away by voluminous reading. The doctrine is almost uniformly sound, and, what is of chief consequence, the arguments in favor of admitting the subject among the branches of human learning are well calculated to convey conviction. The arguments which have been advanced on the other side have sometimes been of a very curious nature. For instance, Mr. Bradley, in his 'Principles of Logic,' scouts it because it does nothing for reasoning that is not syllogistic—for example, for such reasoning as this: A is north of B, E = C, therefore A is north of C. In the first place, it is not true that reasoning of this kind is not included in an Algebra of Logic. The formal definition of the primary copula is simply that it is transitive—that is, that it is subject to the single condition that when A stands in a certain relation to B, and B stands in that same relation (or a limiting case of it) to C, then A stands in that same relation to C. Any relation whatever which fulfills this condition is already included in the Algebra of the primary copula—the copula, that is, which represents, in the first instance, the words "all . . . are . . ."

But in the second place, even if the Algebra of Logic covered syllogism only, no one could doubt its value who had tried to perform without it the extremely complicated pieces of syllogistic reasoning which it can work out by purely mechanical processes. The fact that not many instances of reasoning of this sort can be got from real life shows nothing. As Dr. Schröder points out, it is not strange that this kind of reasoning was seldom attempted at a time when it was almost impossible of accomplishment. Mr. McColl has already made a useful application of the theory to the determination of the new limits of several integrals upon a change in the order of integration.

Dr. Schröder makes constant acknowledgment, in very graceful terms, to the work of Mr. Charles S. Peirce and his school. He rightly considers that Boole's contributions to the subject possess, at present, only an historical interest. He seems to us to attribute rather less value than is due to the method of Mr. O. H. Mitchell as described in the 'Studies in Logic by Members of the Johns Hopkins University.'

Dr. Schröder's book is the only one, in any language, in which the subject can be properly approached by one who takes it up for the first time. We learn that a Spanish logician has undertaken a translation of it. For an English-speaking public, a somewhat different presentation of the subject would be preferable.