

28 (3 April 1879) 234-235

READ'S THEORY OF LOGIC.

The Theory of Logic: an Essay.

By Carveth Read. London, 1878.

CSP. identification: Haskell. *Index to The Nation*. See also: Burks. *Bibliography: List of Articles*.

Carveth Read (1848-1931) was an English philosopher and psychologist. He held the Grote professorship of Philosophy in the University of London from 1908 until 1911, and was lecturer on comparative psychology at University College, London, from 1911 until 1921. Read was emeritus professor of philosophy and comparative psychology at the University of London from 1921 until his death.

This work is the fruit of a travelling scholarship. But in all his travels the author seems never to have come across any modern logic, except in English. Three views, he observes, have been taken of logic, which, if limited to England, is true. Some writers consider it as a study of the operations of the understanding, thus bringing it into close relations with psychology. Others regard it as an analysis of the conditions which must be conformed to in the transformations of verbal expressions in order to avoid the introduction of falsehood. While others again—our author among them—think the propositions of logic are facts concerning the things reasoned about.

There is certainly this to be said in favor of the last opinion, namely, that the question of the validity of any kind of reasoning is the question how frequently a conclusion of a certain sort will be true when premises of a certain sort are true; and this is a question of fact, of how things are, not of how we think. But, granted that the principles of logic are facts, how do they differ from other facts? For facts, in this view, should separate themselves into two classes, those of which logic itself takes cognizance and those which, if needed, have to be set up in the premises. It is just as if we were to insist that the principles of law were facts; in that case we should have to distinguish between the facts which the court would lay down and those which must be brought out in the testimony. What, then, are the facts which logic permits us to dispense with stating in our premises? Clearly those which may always be taken for granted; namely, those which we cannot consistently doubt, if reasoning is to go on at all: for example, all that is implied in the existence of doubt and of belief, and of the passage from one to the other, of truth and of falsehood, of reality, etc. Mr. Read, however, recognizes no such distinction between logical principles and other facts. For him logic simply embraces the most general laws of nature. For instance, he recognizes as a logical principle the law of the conservation of energy, which is even yet hardly set beyond all doubt. If he excludes the laws of geometry, as being "quantitative," it is by an ill-founded distinction. If he does not mention the law of gravitation nor the existence of a luminiferous ether as logical principles, it must probably be because he thinks them less general truths than the laws of motion.

KETNER AND COOK—CHARLES SANDERS PEIRCE

The especial purpose of the book is to arrange the principles of logic, considered as matters of fact, in regular order, beginning with the most abstract and general, and proceeding towards the particulars. In short, it is an attempt to give a syllabus of the most general laws of nature. This is a well-conceived idea.

After the introduction, the first chapter treats of *Relation*. We notice immediately the illogic of thus making relation the most abstract of facts. Existence should come first and quality next; no competent logician, however he might modify this statement, will deny its approximate truth. Why does Mr. Read not begin with *Being*? Is it because the writers he follows greatly insist on the point that existence and qualities depend on relations? There is this dependence, no doubt; the abstract and general always depend on the concrete and particular. But having undertaken to arrange the subject in synthetical order, which consists in putting the abstract before the concrete, Mr. Read should not violate the principle of arrangement at the very outset. Turning, however, to the substance of the chapter, we are told that relation cannot be defined. This is not exact; it can and has been defined; but what is true is that it cannot be defined without considering the operations of the mind or the general nature of language. But the author is endeavoring to state the principles of logic without referring to either of these. He is, therefore, unable to explain the notion of relation, because to do so he must explicitly introduce those notions which he wishes to exclude. Not being able to define relation, he typifies it. This he does by the following figure—two spots united by a line:



But here he betrays a not altogether distinct conception of relation. These two spots are similarly related to one another. Now there are certainly relations of this kind. If A is like B, B is like A; if A is unlike B, B is unlike A, etc. But, generally speaking, two related objects are indifferent relations to one another. The relation of father to son, for example, is different from the relation of son to father. So that if we desire to make a sort of hieroglyph for relation in general, it should be something like this: $A \rightarrow B$.

We next meet with an enumeration of the ultimate modes of relation. These are stated to be three—viz.:

1. Likeness and unlikeness.
2. Succession and non-succession.
3. Coexistence and non-coexistence.

Succession is defined as unlikeness in time; and coexistence as likeness in time. If that be so, the second and third modes are not ultimate, but are only species of the first. Substituting the definitions for the terms defined, they are:

2. Unlikeness in time and non-unlikeness in time.
3. Likeness in time and non-likeness in time.

Hardly a model of synthetic orderliness.

But what does the author do with the great body of relations? What pigeon-holes has he for them in his scheme of arrangement? Take, for instance, the relation of striker to struck. A man's striking another constitutes certainly no resem-

blance between them. But neither is it an unlikeness, for a man may strike himself, and since he is then a striker only so far as he is struck, and *vice versa*, it is impossible to say that striker and struck are unlike. In short, the relation is neither a likeness nor an unlikeness, for the reason that both these latter are relations between objects similarly related to one another, while the relation of striker to struck, like most relations, is between dissimilarly related objects.

The few pages we have thus examined are a fair specimen of the strength of the whole book. Its purpose is a sharply-defined one; its style is clear and free from verbiage; and if it is not a striking success, it is because its author is not thoroughly well grounded in his subject.

29 (16 October 1879) 260

ROOD'S CHROMATICS

Modern Chromatics. With Applications to Art and Industry.

By Ogden N. Rood, Professor of Physics in Columbia College: With 130 original illustrations. New York: D. Appleton & Co. 1879.

CSP. identification: Haskell, *Index to The Nation* (the last two paragraphs are by Russell Sturgis, a contributor specializing in topics on art). See also: Burks, *Bibliography*; Ejsch and Haskell, *Additions to Cohen's Bibliography*.

Ogden Nicholas Rood (1831-1902) entered Yale in 1848, but transferred to Princeton where he was graduated in 1852. He held the position of professor of physics and chemistry at Troy University from 1858 until 1863, and was professor of physics at Columbia University until his death. His *Modern Chromatics* gained immediate acceptance as the most authoritative text on that subject, and was translated into French, German, and Italian. Rood, known as the "Father of American Experimental Physics," was an extensive contributor to the *American Journal of Science*, and was highly regarded among the scientific community. He was a member of the National Academy of Science, the American Association for the Advancement of Science, and the Century Club of New York.

The utility and significance of visual perceptions distract attention from the mere sensuous delight of color and light; yet few elementary pleasures are so insatiable. The spectrum, however often it may be seen, never ceases to afford the same sense of joy. The prices paid for luminous and colored stones, though exaggerated by fashion, could only be maintained on the solid foundation of a universal pleasure in color and light, together with a sense of similitude between this feeling and those which the contemplation of beauty, youth, and vigor produces. This pleasure makes one of the fascinations of the scientific study of color. Besides this, the curious three-fold character of color which assimilates it to tri-dimensional space, invites the mathematician to the exercise of his powers. And then there is the psychological phenomenon of a multitude of sensations as unaltered by the operation of the intellect, and as near to the first impression of sense, as any perception which it is in our power to extricate from the complexus of consciousness—these sensations given, too, in endless variety, and yet their whole diversity resulting only from a triple variation of quantity of such a sort that all of them are brought into intelligible relationship with each other, although it is perfectly certain that quantity and relation cannot be objects of sensation, but

are conceptions of the understanding. So that the question presses, What is there, then, in color which is not relative, what difference which is indescribable, and in what way does the pure sense-element enter into its composition?

In view of these different kinds of interest which the scientific study of color possesses, it is not surprising that the pursuit is one which has engaged some of the finest minds which modern physics can boast. The science was founded partly by Newton and partly by Young. It has been pursued in our day by Helmholtz and by Maxwell; and now Professor Rood produces a work so laden with untiring and skilful observation, and so clear and easy to read, that it is plainly destined to remain the classical account of the color-sense for many years to come. Chromatics is to be distinguished from several other sciences which touch the same ground. It is not chemistry, nor the art of treating pigments, nor optics (which deals with light as an undulation, or, at least, as an external reality); nor is it a branch of physiology, which might study the various ways of exciting the sensation of color, as by direct sensation, contrast, fatigue, hallucination, etc.; nor is it the account of the development of the color sense. The problems of chromatics are two: First, to define the relations of the appearances of light to one another; and second, to define their relations to the light which produces them. It is, therefore, a classificatory, not a cause-seeking science. The first series of relations according to which it classifies colors are those of the appearances in themselves. Here we have grey ranging in value from the darkest shade to the white of a cloud. The shades may be conceived as arranged along an axis about which we have circles of color—yellow, red, blue, and green, with their infinite intermediate gradations. Each of these varies in value, and also in its color-intensity, from neutrality at the centre to the most glaring hues at the circumference.

The second series of relations which the science of chromatics considers are those which subsist between the appearance of a mixture of lights and the appearances of its constituents. By a mixture of lights is not meant a mixture of pigments, but the effect of projecting two colors—say, for instance, by two magic-lanterns—upon the same spot. It has been found that for this kind of mixture (although not for the mixture of pigments) the appearance of the mixture is completely determined by the appearances of the constituents, whatever may be the physical constitution of the light of the latter. The effect of mixing two lights is, roughly speaking, similar to that of adding together the sensations produced by the two lights separately. Let, for example, two precisely similar lights be projected on the same spot, and the result will be brighter than either, and in hue and color-intensity nearly like them. If white and blue be thrown together, the result will be a brighter and more whitish blue. Red and blue thrown together will give purple, blue and green will give blue-green, yellow and red will give orange, etc. Unfortunately for the perspicuity of the subject, this approximate equivalence between mixing light and adding together sensations is not precise, nor even very close. On the contrary, the mixture is always less bright and nearer to a certain yellow than the sum of the sensations of the constituents. This yellow, the precise color of which is defined, is one in comparison with which the purest yellow that can be isolated appears whitish. It has been called the *color of bright-*