The Open Court.

Devoted to the Work of Conciliating Religion with Science.

No. 268. (Vol. VI—11.) CHICAGO, OCTOBER 13, 1892.

THE CRITIC OF ARGUMENTS.

BY CHARLES F. PEIRCE.

II. THE READER IS INTRODUCED TO RELATIVES.

There is a melancholy book entitled "Astronomy Without Mathematics." The author, an F. R. A. S., presumably knew something of astronomy; therefore, I pity him. I think he bears his graces and malapropisms, as he wrote the book, over the initial lie to which he had committed himself, that is to say, he went on without making any idea of the science of astronomy without making use of mathematics. He could tell roughly how the planets go round the sun, and make his readers think they knew what the earth—really, no error—and could set down surprising figures about the stars (beside, however, by Buddhistic numbers both in magnum and in intellectual value). A book so made might well have been called "The Story of the Heavens" (in anticipation of Dr. Ball's splendid volume, which, promising little, performs much), but it was not the "astronomy" stipulated for in the title page. When, in a neighbor's house yesterday, my eye lit upon that book, I shuddered. For I too have engaged myself by the title of these pages to produce something of solid value to my readers; but, thank God, I have not agreed to do it without the use of mathematics. I came home and pondered; and have decided that, in order to fulfill legitimate expectations, I must begin with a few chapters upon certain dry and somewhat technical matters that underlie the more interesting questions concerning reasoning. Do not fear a repetition of matter to be found in common textbooks. I shall suppose the reader to be acquainted with what is contained in Dr. Watts's "Logic," a book very cheap and easily procured, and far superior to the treatises now used in colleges, being the production of a man distinguished for good sense. I mean to bring out a reprint of it, with extensive annotations, whenever I can find an eligible publisher. Though a life-long student of reasonings, I know no way of giving the reader the benefit of what I have learned, without asking him to go through with some irreconcilable thinking about relations.

For this subject, although always recognized as an integral part of logic, has been left untouched on account of its intricacy. It is as though a geographer, finding the whole United States, its topography, its population, its industries, etc., too vast for convenient treatment, were content to himself with a description of Nantucket. This comparison hardly, if at all, exaggerates the inadequacy of a theory of reasoning that takes no account of relative terms.

A relation is a fact about a number of things. Thus the fact that a locomotive blows off steam constitutes a relation, or more accurately a relationship (the Conveyer Dictionary, under relation, states gives the terminology. See also relatively, etc.) between the locomotive and the steam. In reality, every fact is a relation. Thus, that an object is blue consists of the peculiar regular action of that object on human eyes. This is what should be understood by the "relativity of knowledge." Not only is it every fact really a relation, but your thought of the fact implicitly represents it as such. Thus, when you think "this is blue," the demonstrative "this" shows you are thinking of something just brought up to your notice, while the adjective shows that you recognize a familiar idea as applicable to it. Thus, your thought, when explicated, develops into the thought of a fact concerning this thing and concerning the character of blueness. Still, it must be admitted that, antecedently to the unswerving of your thought, you were not actually thinking of blueness as a distinct object, and therefore were not thinking of the relation as a relation. There is an aspect of every relation under which it does not appear as a relation.

Thus, the blowing off of steam by a locomotive may be regarded as merely an action of the locomotive, the steam not being conceived to be a thing distinct from the engine. This aspect we euphrase in saying, "the engine blows.

Thus, the question whether a fact is to be regarded as referring to a single thing or to more is a question of the form of proposition under which it suits our purpose to state the fact. Consider any argument con-
Cerning the validity of which a person might conceivably entertain for a moment some doubt. For instance, let the premise be that from either of two provinces of a certain kingdom it is possible to proceed to any province of the other kingdom; and further that the kingdom contains, combined with a land journey within the boundary of one province; and let the conclusion be that there is a journey, after taking the opposite course in the kingdom, must again meet the one which it first left. Now, in order to show that this inference is (or that it is not) absolutely necessary, it is necessary to have some analogous to a diagram with different series of parts, the parts of each series being evidently related as those provinces are said to be, while in the different series some bond corresponding to the course of the river has all the essential variations possible; and this diagram must be so contrived that it is easy to examine it and find out whether the course of the river is true in every case such as is here proposed to be inferred. Such a diagram has got to be either auditory or visual, the parts being separated as the one case in time, in the other in space. But in order completely to exhibit the analogue of the conditions of the argument under examination, it will be necessary to use signs or symbols of repeated in different phenomenon in different situations, these being signs subject to certain "rules," that is, certain general relations associated with them by the person forming a diagram is called algebra. All speech is but such an algebra, the repeated signs being the words, which have relations by virtue of the meanings associated with them. What is commonly called logical algebra differs from other formal logic only in using the same formal method with greater freedom. I may mention that unpublished studies have shown me that a far more powerful method of diagrammatization than algebra is possible, being an extension at once of algebra and of Clifford's method of graphs; but I am not in a situation to draw up a statement of my researches. Diagrams and diagrammatical figures are intended to represent the interdependence of states of things, whether experienced or read of or imagined. Such a figure cannot, however, show what it is to which it is intended to be applied; it can show any other diagram available for that purpose. The whole and the whim of the particular experience, or the occasion or other identifying circumstance of the particular fiction to which it is applied, are things not capable of being diagrammatically exhibited. Describe and describe and describe, and you never can describe a dead animal. Infinitely less capable in algebra. You may object that a map is a diagram showing locations; undoubtedly, but not until the law of the projection, is understood, not even then unless at least two points on the map are somehow previously identified with points in nature. Now, how is any diagram ever to perform that identification of a given diagram? or do we not say of a diagram, "there is a diagram ExecutionContext for algebra but is a sort of diagram; and if algebra cannot do it, language cannot; for language, as we have seen, means something in one sense be extravagant to say that we can never tell what we are talking about; yet, in another sense, it is quite true. This is one of the words ordinarily depend upon our tendencies to mental habits and our epistemologies to see similarities, or, to use the received phrase, upon associations by similarity; while experience is bound together, and only recognisable, by forces acting upon us, or, to use an even worse modern technical term, by means of associations by contiguity. Two men meet on a country road. One says to the other, "that house is on fire." What house? Why, the house about a mile to my right." Let this speech be taken as signifying to anybody in the neighboring village, and it will appear that the language by itself does not fix the house. But the person addressed sees where the speaker is standing, recognizes his right-hand side, and so on, and, by a singular mode of signification, estimates a sub, (a length having no geometrical properties different from other lengths), and looking there, sees a building. It is not the language alone, with its mere associations of similarity, but the language taken in connection with the auditor's own experiential associations of contiguity, which determines for him what house is meant. It is requisite then, in order to show what we are talking or writing about, to put the hearer's or reader's mind into real, active connections with the case, and supple- riment of fiction with which we are dealing, and, further, to draw his attention to, and identify, a certain number of particulars present in his experience. If there be a reader who cannot understand my writings, let me tell him that no straining of his mind will help him; his whole difficulty is that he has no certain experience of the world of problems of which I am talking, and he might as well close the book until such experience comes. That the diagrammatization is one thing and the application of it to the special case under consideration, is recognized obscurely in the structure of such languages as I am acquainted with, which distinguish the specific from the general, the material from the immaterial. If you are the ideas of the things spoken of, the predicates what, that, or question, or command whatever is intended. The one is a fact in its manifesting to see the representation of mere words, and especially of common nouns, to fulfill the function of group-member. Words like this, these, any, all, these, have a direct, function, as the nervous system, and compel the hearer to look about him; and so they, more than ordinary words, contribute towards indicating what the speech is about. But this is a point that grammar and the grammarians (who, if they are faithfully to mirror the minds of the language-makers, can hardly be scientific analysts) are so far from seeing as to call demonstratives, such as this or that, non-proper names; a literate pre- testation for designation, for nouns must more truly be called demonstratives. In any case, a few or two or more points to be identified at some future time with objects in nature, so far as to give the diagram at that future time its meaning; or if in any written statement we put dashes in place of two or more demonstratives or demonstr- stratives, the profoundly incomplete representation resulting may be termed a relative rhyme. It differs from a relative rhyme in retaining the "supers" or signal of assertion. If only one demonstrative or pro-demonstrative is erased, the result is a non-relative rhyme. A relative rhyme, "I buy from — for the price —," is a relative rhyme; it differs in a merely secondary way from "— is bought by — from —;" or from "— sells to — for —;" and from "— is paid by — to — for —;" on the other hand, "— is mortal" is a non-relative rhyme. A rhyme is somewhat closely analogous to a chemical atom or radicle with unattainable bonds. A non- relative rhyme is like a univalent radicle; it has but one strong bond with another. A relative rhyme is like a multivalent radicle. The blanks of a rhyme can only be filled by terms, or, what is the same thing, by "supers" (or the like) followed by a rhyme; or, two can be filled together by means of "supers" of the same kind. So, in chemistry, unattainable bonds can only be satisfied by joining of two of them, which will usually be the case, unless they belong to different ra- jules. If two univalents rhyme are united, the result is a saturated compound. So, two non-relative rhymes, joined to each other, produce a non-relative rhyme. Thus, to join "— is mortal" and "— is a man," we have "— is mortal and X is a man," or "— is mortal and man," or some man is mortal. So likewise, a saturated compound may result from join- ing two bonds of a bivalent radicle; and, in the same way, the two blanks of a dual rhyme may be joined to make a complete proposition. Thus, "— loves — " or "— sells itself. A univalent radicle united to a bivalent radicle gives a univalent radicle (as E-H); and, in like manner, a non-relative rhyme gives a non-relative rhyme. Thus, "— is mortal" joined to "— loves —" gives "— is mortal and loves —" which is a non-relative rhyme, since it is only one blank and two relative radicles united, give a bivalent radicle (as O - O - O - O - O); and two or more dual rhemes give a dual rhyme; as "— loves somebody that loves somebody that loves somebody". Note relative and pun rhemes of the same kind, so long as the junctions are by two; but junctions of triple rhemes (or junctions of two or more rhemes by two) will produce higher orders. Thus, "— gives to — and —" takes — from —, "— gives to somebody who takes — for a couple rhyme. This one joins to another quadruple rheme, as "— sells to — for —" gives the sextuple rhyme "— gives to somebody who takes — from somebody who sells — to — for —." Accordingly, all rhemes higher than the dual may be considered as belonging to one and the same order; and we may easily that all rhemes are either singular, dual, or plural.

Such, at least, is the doctrine I have been teaching for 25 years, and which, if slowly pondered, will be found to enwrap an entire philosophy. Kant taught that our fundamental conceptions are merely the in- tellectable ideas of a system of logical forms; nor is any occult transcendentalism requisite to show that this is so, and must be so, for more only appears intelligible so far as it appears rational, that is, so far as its pro- cesses are seen to be like processes of thought. I must take my place created, for I have no space here to argue it. It follows that if we find three distinct and irre- dible forms of rhemes, the ideas of those should be a number of fundamental metaphysical. There are three elementary forms of categories, the conception of Kant, to which Hegel subscribes; and Kant seeks to establish this from the analysis of formal logic. Under which stands so excessively superficial that his argument is desti- tute of the slightest value. Nevertheless, his conclu- sion is correct. It corresponds to a formidable objection to the ideas which belong to the three forms of rhemes: firstness, secondness, thirdness; firstness, or spontane- ous; secondness, or dependence; thirdness, or medi- ation. But Mr. A. B. Keynes, in his important paper on the "Theory of Mathematical Forms," presents an analysis which corresponds to a formidable objection to my views. He makes diagrams of spots connected by lines; and it is easy to prove that every possible system of relationship can be represented, although he does not perceive the evidence of it.
THE OPEN COURT.

shows (§ 69) that every such form can be represented by spots indefinitely varied, some of them being connected by lines, all of the same kind. He thus represents every possible relationship by a diagram consisting of only two different kinds of elements, namely, spots and lines between pairs of spots. Having examined this analysis attentively, I am of opinion that it is of extraordinary value. It causes me somewhat to modify my position, but not to surrender it. For, in the first place, it is to be remarked that Mr. Kempe's conception depends upon considering the diagram purely in its self-contained relations, the idea of its representing anything being altogether left out of view; while my doctrine depends upon considering how the diagram is to be connected with nature. It is not surprising that the idea of thirdness, or mediation, should be scarcely discernible when the representative character of the diagram is left out of account. In the second place, while it is not in the least necessary that the spots should be of different kinds, so long as each is distinguishable from the others, yet it is necessary that the connections between the spots should be of two different kinds, which, in Mr. Kempe's diagrams, appear as lines and as the absence of lines. Thus, Mr. Kempe has, and must have, three kinds of elements in his diagrams, namely, one kind of spots, and two kinds of connections of spots. In the third place, the spots, or units, as he calls them, involve the idea of finiteness; the two-ended lines, that of secondness; the attachment of lines to spots, that of mediation.

My position has been modified by the study of Mr. Kempe's analysis. For, having a perfect algebra for dual relations, by which, for instance, I could express that "A is at once lover of B and servant of C," I declared that this was inadequate for the expression of plural relations; since to say that A gives B to C is to say more than that A gives something to C; and gives to somebody, which is given to C by somebody. But Mr. Kempe (§ 330) virtually shows that my algebra is perfectly adequate to expressing that A gives B to C, since I can express each of the following relations:

In a certain act, D, something is given by A.
In the set, D, something is given to C.
In the act, D, to somebody is given B.
This is accomplished by adding to the universe of concrete things the abstraction "this action." But I remark that the diagram fails to afford any formal representation of the manner in which this abstract idea is derived from the concrete ideas. Yet it is precisely in such processes that the difficulty of all difficult reasoning lies. We have an illustration of this in the circumstance that I was led into an error about the capability of my own algebra for want of just the idea that process would have supplied. The process consists, psychologically, in catching one of the transient elements of thought upon the wing and converting it into one of the resting places of the mind. The difference between setting down spots in a diagram to represent recognized objects, and making new spots for the creations of logical thought, is huge. To include this last as one of the regular operations of logical algebra is to make an intrinsic transmutation of that algebra.

What that mutation was I had already shown before Mr. Kempe's memoir appeared.

THE PSYCHOLOGY OF BUDDHISM.

BY PROF. H. D. WILLIAMS.

What was this knowledge? It is this: Physical life and suffering are one thing. To be born is to suffer. The cause of suffering is the cause of physical existence. And the cause of physical existence is desire. Why does the soul desire? It is through ignorance. Ignorance, not knowing, is a positive thing, a power. This can be displaced by knowledge, a positive thing, a power. Knowledge is the only thing that will overcome ignorance. It will uproot the cause of desire. Knowledge thus destroys the cause of physical existence. It breaks the endless chain of transmigration. Knowledge is salvation.

From the viewpoint of Gotama, this solution was the only one possible. For to him, the cause of the child is not the parents. These are only incidents in a process. The cause of the child lies in the child itself, in the ego, as we say. The physical form is but one of a thousand ethers, and the essential child has persisted through all these physical forms. What then is there within the child itself that could be the cause of its physical existence? This was Gotama's problem. And the deepest answer he could give was the one he gave, viz., desire. (Desire is used in an inclusive sense.) He reached this doctrine through an analysis of conduct and easily identified the ground of conduct with the ground of physical existence, being a Hindoo.

The third crisis involves the resolution to preach. Gotama had won his own salvation. The knowledge that brought him salvation made him Buddha. His doctrine was won at high cost. It was not easy to be understood. Should he preach it to men? He debated as follows: "This profound truth, I have, after many struggles, perceived; a truth difficult to discover; a truth difficult to understand; a truth fraught with blessings; supreme, transcending all thought; a truth, teeming with meaning; one that the sage alone can grasp. The race of man is of the earth: there it moves and has its being, there is its abode,