

§1. Mathematics deals essentially with Signs. All that we know or think is known or thought by signs, and our knowledge itself is a sign. The word and idea of a sign is familiar but it is indistinct. Let us endeavor to analyze it.

It is plain at the outset, first, that a sign is not any particular replica of it. If one casts ones eye down a printed page, every 'the' is the same word, and every e the same letter. The exact identity is not clear. Secondly, a sign may be complex; and the parts of a sign, though they are signs, may not possess all the essential characters of a more complete sign. Thirdly, a sign sufficiently complete must be capable of determining an interpretant sign, and must be capable of ultimately

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producing real results. In a proposition of metaphysics which could never contribute to the determination of conduct would be meaningless jargon. On the other hand, the cards which, slipped into a Jacquard Loom, cause appropriate figures to be woven, may very properly be called signs although there is no conscious interpretation of them. If not, it can only be because they are not interpreted by signs. In fact, in the present condition of philosophy, consciousness seems to be a mere quality of feeling of which a formal science need well do best to leave out of account. But a sign only functions as a sign when it is interpreted. It is therefore essential that it should be capable of determining an interpretant sign. Fourthly, a sign sufficient to be complete must in some sense correspond to a real object. A sign cannot even be false unless, with some degree of definiteness, it individually ~~definitely~~ specifies the ^{real} object.

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object of which it is false. That the sign itself is not a definite real object has been pointed out under "firstly". It is only represented. Now either it must be that it is one thing to ^{really} be and another to be represented, or else it must be that there is no such thing is false. This ~~is~~ involves no denial that every real thing may be a representation, or sign, but merely that ^{if so,} there must be some thing more in reality than mere representation. Since a sufficiently complete sign may be false, and also since it is not any replica or collection of replicas, it is not real. But it ^{refers to} ~~has~~ a real object. Consequently, a sign cannot have a sign as its sole object; though it may refer to an object through a sign; as if one should say, "Whatever the Pope, as such, may declare will be true," or as a map may be a map of itself. But supposing the Pope not to declare anything, does ~~not~~ that pro-

position refer to any real object? Yes, to the Pope.

But, fifthly, even if there were no pope, still, like all other signs sufficiently complete, there is a single definite object to which it must refer; namely, to the 'Truth', or the Absolute, or the entire Universe of real being. Sixthly, a sign may refer, in addition, and specially, to any number of parts of that universe. Seventhly, ^{every} an interpretant of a sign need not refer to all the real objects to which the sign itself refers, but must, at least, refer to the Truth. Eighthly, an interpretant may refer to an object of its sign in an indefinite manner. Thus, given the sign, 'Enoch was a man, and Enoch was translated,' and interpretant of it would be 'Some man was translated.' Ninthly, a sign may refer to its interpretant ⁱⁿ ~~so~~ ^{such a way} ~~as~~ that, in case the former sign is incomplete, the interpretant, ~~may refer to an~~ being an interpretant of the, ~~complete~~ ^{completer} sign, may refer to a sign to

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which the first sign does not specially ~~refer~~ refer, but only generally refers. Thus, the sign 'Any man ^{there maybe,} is mortal' does not refer to any ~~part~~ real man, unless it so happens that it is a part of a sign which otherwise refers to ~~a man~~ such a real thing. But if it be a part of a sign of which another part is 'some man sings', the sign 'some man is mortal' becomes an interpretant of it. This may be more conveniently expressed by speaking of an 'utterer' and an 'interpreter.' Then the utterer says to the interpreter, "you are at liberty to ^{understand} consider me as ~~referring to any man whom you can find, and of him, I say that he is mortal.~~ ^(get any indication) ~~referring to any man whom you can find, and of him, I say that he is mortal.~~" Truly, a sign sufficiently complete must signify some quality; and it is no more important to recognize that the real object ^{to which} of a sign ^{refers} is not a mere sign than to recognize that the quality it signifies is not a mere

Sign. Take the quality of the odor of attar. There is no difficulty in imagining a being whose entire consciousness should consist in this alone. ~~The~~ But, it may be objected, if it were contrasted with nothing could it be recognized? I reply, no; and besides, such recognition is excluded by the circumstance that a recognition of the smell would not be the pure smell itself. It may be doubted by some persons, however, whether the ~~sense~~ feeling could exist alone. They are the persons whom it ought to be easiest for me to convince of my point. For they, at least, must admit that if such pure homogeneous quality of feeling could mere to exist alone, it would not be a sign. Everybody ought to admit it because it would be alone, and therefore ^{would} have no object different from itself. Besides, there would be no possible

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replica of it, since each of two such beings would be non-existent for the other; nor could there be any third who should compare them. So, then, the whole question of whether such a quality is a sign or not resolves itself into the question of whether there could be such a tinge upon the consciousness of a being, To decide that supposing the being could be conscious (for I shall show presently that the fact that he would be asleep is only in my favor.) In order to decide this question, it will be sufficient to look at any object parti-colored in ~~red~~ bright red and bright blue and to ask oneself a question or two. Would there be any possibility of conveying the idea of that red to a person who had no feeling nearer to it than that blue? Plainly not, the quality of the red is in-itself in the red itself. The proximity of the blue heightens the shock up the ~~sensory~~ seers organism,

In itself, one quality is as simple as another. A person who should ~~know~~ be acquainted with none but the spectral colors would get no idea of white by being told that it was the mixture of them all. One might as well tell him to make a mixture of water, patriotism, and the square root of minus one. Find a man whose ~~is~~ ^{has had} no idea of patriotism; and if you tell him that it is the love of one's country, if he ~~has~~ knows what love is, and what a man's country, in its social sense, is, he can ^{make the experiment of connecting} ~~connect~~ those two ideas in his imagination, and noting the ~~feels~~ quality ~~that~~ ^{is} of feeling which arises upon their composition. Tell him this in the evening, and he will repeat the experiment several times during the night, and in the morning he will have a fair idea of what patriotism means. He will

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have performed an experiment analogous to that of mixing colored lights in order to get an idea of white. If a treasure is buried in the midst of a plain, and there are four signal poles, the place of the treasure can be defined by means of gauges, ^{take ranges and} so that a person who can set up new poles ~~and~~ can find the treasure. In like manner ^{the name of,} any color may be defined in terms of four color disks so that a person with a color wheel can ~~be~~ experimentally produce the color and thereafter be able to use the name. Every definition ^{to be understood must be treated} ~~supposes an experi~~ as a precept for experimentation. The imagination is an apparatus for such experimentation that often answers the purpose, although it often proves insufficient. No point on the plain where the treasure is hid is more simple than another. Colors may be defined by various systems of coordinates, and

we do not know that one quality, color is in itself simpler than another. It is only in a limited class of cases that we can define a quality as a ^{simple} mixture of two qualities. In most cases, it is necessary to introduce other relations. But even when that is the case, if a quality is defined as being at once a and b, there will always be another way of defining it as that which is at once c and d. Now ~~whatever~~ ^{all that} is either a or c will have a certain quality p, common and peculiar to such that class; the class of possible objects that are either a or d will have a quality, q, common and peculiar to it; the class of possible objects ^{that are} b or c will be similarly related to a quality, r; and the class of possible objects that are either b or d will be similarly related to a quality, s. Then that quality which was defined as pt once, a and b, can be more analytically defined as that which is at once p, q, r, and s.

and so on ad infinitum. We may not be able to make out these qualities; but there is reason to believe that any describable class of possible objects has some quality common and peculiar to it. It is certain that a pure quality, in its mode of being as a pure quality, does not cease to be because it is not embodied in anything. Every situation in life appears to have its peculiar ~~quality~~ flavor. This flavor is what it is positively and in itself, ~~the~~ ~~test~~ experiment by which it may be reproduced may be an adequate prescription may be given; but the definition will not itself have that flavor. To say that a flavor, or pure quality, is composed of two others, is simply to say that on experimentally mixing these others in a particular way, that first flavor will be reproduced. Every sufficiently complete sign determines a sign to the effect that on a certain occasion, that is, in a certain object a certain flavor or quality may be

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This attempt to begin an analysis of the nature of a sign may seem to be unnecessarily complicated, unnatural, and ^{ill-fitting} strained. To that I reply that every man has his own fashions of thinking; and if such is the reader's impression let him draw up a statement for himself. If it is sufficiently full and accurate, he will find that it differs from mine chiefly in its nomenclature and arrangement. [Not unlikely he might insist on distinctions which I avoid as irrelevant.] He will find that, in some shape, he is brought to recognize the same three radically different elements that I do. Namely, he must recognize, first, a mode of being in itself, corresponding to my quality; secondly, a mode of being constituted by opposition, corresponding to my object; ~~then~~ and thirdly, a mode of being of which a branching line Υ is an analogue, and which is of the general nature of a mean function, corresponding to the sign.

§ 2. Partly in hopes of ~~making~~ reconciling the reader to my statement, and partly in order to bring out some other points that will be pertinent, I will review the matter in another order.

The reference of a sign to the quality which is its ground, reason, or meaning appears most prominently in a kind of sign ~~which~~ ~~where~~ of which any replica is fitted to be a sign by virtue of possessing in itself certain qualities which it would equally possess if the interpretant and the object did not exist at all. Of course, in such case, the sign could not be a sign; but as far as the sign itself went, it would be all that would be with the object and interpretant. Such a sign whose significance lies in the qualities of its replicas in themselves is an icon, image, analogue, or copy. Its object is whatever ^{that} resembles it its interpretant takes it to be, the sign of, and is as sign of that object in proportion as

it resembles it. ~~It is~~ An icon cannot be a complete sign; but it is the only sign - which directly brings the interpretant to close quarters with the meaning; and for that reason it is the kind of sign with which the mathematician works. For not only are geometrical figures icons, but even algebraical arrays of letters have relations analogous to those of the forms they represent, although these relations are not altogether iconically represented.

The reference of a sign to its object is brought into special prominence in a kind of sign whose fitness to be a sign is due, to its being in a real reactive relation, - generally, a physical and dynamical relation, - with the object. Such a sign I term an index. As an example, take a weather-cock. This is a sign of the wind because the wind actively moves it. It ^{points} ~~points~~ in the ^{very} direction from which the wind blows. In so far as it

does that, it involves an icon. The mind forces it to be an icon. A photograph which is compelled by optical laws to be an icon of its object which is before the camera is another example. It is in this way that these ~~sign~~ indices convey ~~assertions~~ information. They are propositions. That is they separately indicate their objects; the weathercock because it turns with the wind and is known by its interpretant to do so; the photograph for a like reason. If the weathercock sticks and fails to turn, ~~it will be~~ or if the camera lens is bad, the one or the other will be false. But if this is known to be the case, they sink at once to mere icons, at best. It is not essential to an index that it should thus involve an icon. Only if it does not, it will convey no information. A cry of "Oh!" may ~~forcibly~~ be a direct reaction from a remarkable situation. But it will convey, perhaps, no further information. A demonstrative pronoun. Courtesy

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The letters on a geometrical figure are good illustrations of pure indices ~~unconnected~~ not involving any icon; that is they do not force anything to be an icon of their object. The cry "Oh!" does to a slight degree; since it has the same startling quality as the situation that compells it. The index acts compulsively on the interpretant and puts it into a direct ~~and~~ real relation with the object, which is necessarily an individual event (or, more loosely, a thing) that is hic et nunc, and single and definite.

A third kind of sign, which brings the reference to an interpretant into prominence is one which is fit to be a sign, not at all because of any particular analogy with the qualities of it signifies, nor because it stands in any reactive relation with ~~the~~ ^{its} object, but simply and solely because it will be interpreted to be a sign. I call such a sign a symbol. An example of a symbol, Goethe's book on the Theory

of colors will serve. This is made up of letters, words, sentences, paragraphs etc.; and the ~~reason~~^{cause of} its referring to colors and attributing to colors the quality it does is that so it is understood by anybody who reads it. It not only determines an interpretant, but it shows very explicitly the special determinant, (the ^{acceptance of} belief in the theory, which it is intended to determine. By virtue of thus specially ~~indicating~~^{showing} its intended interpretant (out of thousands of possible interpretants of it) it is an argument. An index may be, in one sense, an argument; but not in the sense here meant, that of an argumentation. It ~~produces~~^{determines} such ^{interpretant} determinants as it may, without manifesting a special intention of determining a particular ~~an~~ interpretant. It is a perfection of a symbol, if it does this; but it is not essential to a symbol that it should do so. Erase the conclusion of an argumentation and it becomes

a proposition (usually, a copulative proposition). Erase
 such a part of a proposition that if a proper name were
 inserted in the blank, or if several proper names were
 inserted in the several blanks, and it becomes a schema,
 or term. Thus, the following are schemata:

Guiteau assassinated —

— assassinated —

Logicians generally would consider it quite wrong for
 me to call these Terms; but I shall venture to do so.

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producing real results. A system of metaphysics
which should never be capable of ~~producing~~ determining
conduct in any case would be jargon. But if there
were a machine which, like a

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position refer to any real object? Yes, to the Pope.
Every ^{sufficiently complete sign} proposition refers to a single definite object;
and furthermore, all signs refer to the same single
definite object, the "Truth", or the Absolute, the
entire universe of real being. Fifthly, the inter-
pretant of a sign refers to the same object as the sign
itself

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position refer to any real object? Yes to the Pope.
But what if there were no Pope? Still, like ^{all} ~~every~~
other signs ~~of~~ sufficiently complete it must refer to
a certain single definite object, the 'Truth', or the
Absolute, or the entire Universe of real being. A
~~particular~~ sign may, in addition, refer to some part of
that Universe